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Set	Items	Description
S1	25	CI=(K SS(S) AL SS(S) B SS(S) O SS)(S)NE=4
S2	916	KAB OR KABO
S3	12718	POTASSIUM(N)ALUMINUM(W)BORATE OR BORIC(W)ACID OR K(N)AL(W)-(BO OR BORATE OR B) OR S K2AL2B2O7
S4	1296302	NONLINEAR? OR NON(W)LINEAR?
S5	3059456	CRYSTAL?
S6	2446832	OPTICAL?
S7	4490681	LED? ? OR LIGHT(N)EMIT? OR LUMINANCE OR LUMINESCENCE OR PHOTOLUMINAT? OR ILLUMINAT? OR ILLUME? OR ILLUMINE? OR LASER? ? OR PLD OR OPTIC?
S8	51	K(N)AL(W) (BO OR BORATE OR B)
S9	24	K2AL2B2O7
S10	8	POTASSIUM(N)ALUMINUM(W)BORATE
S11	6	S10 NOT S1
S12	5	RD (unique items)
S13	23	S9 NOT (S10 OR S1)
S14	18	RD (unique items)
S15	46	S8 NOT (S10 OR S1 OR S9)
S16	40	RD (unique items)
S17	884	S2 NOT (S1 OR S8 OR S9 OR S10)
S18	23	S17 AND S5
S19	21	RD (unique items)

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1/3,AB/1 (Item 1 from file: 2)

DIALOG(R)File 2:INSPEC

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7528392 INSPEC Abstract Number: A2003-06-4265K-034, B2003-03-4340K-070

Title: 200 mW average power UV generation at 0.193  $\mu\text{m}$  in K/sub 2/A1/sub 2/B/sub 2/O/sub 7/

Author(s): Kato, K.; Takaoka, E.; Umemura, N.; Zhang-Gui Hu; Yoshimura, M.; Mori, T.; Sasaki, T.

Author Affiliation: Dept. of Electr. Eng., Osaka Univ., Japan

Conference Title: Technical Digest. Summaries of papers presented at the Conference on Lasers and Electro-Optics. Conference Edition (IEEE Cat. No.02CH37337) Part vol.1 p.331 vol.1

Publisher: Opt. Soc. America, Washington, DC, USA

Publication Date: 2002 Country of Publication: USA (670+96 suppl.)

pp.

ISBN: 1 55752 705 9 Material Identity Number: XX-2002-02418

Conference Title: Technical Digest. Summaries of papers presented at the Conference on Lasers and Electro-Optics. Conference Edition

Conference Sponsor: IEEE/Lasers & Electro-Opt. Soc.; OSA-Opt. Soc. America; Quantum Electron. Div. Eur. Phys. Soc.; Opt. Soc. Japanese Quantum Electron. Joint Group

Conference Date: 19-24 May 2002 Conference Location: Long Beach, CA, USA

Language: English

Abstract: Summary form only given. We report the first attainment of UV generation at 0.193  $\mu\text{m}$  in KAB. This was achieved by mixing the Nd:YAG laser at 1.0642  $\mu\text{m}$  with the SFG output of the RTA OPO tuned to 0.2358  $\mu\text{m}$ . The average output power we generated at 0.2358  $\mu\text{m}$  was 0.8 W at 10 KHz. Since the polarization direction of the 0.2358  $\mu\text{m}$  beam differs 45 degrees from the Nd:YAG laser fundamental beam, a 45 degrees polarization rotator was placed in the Nd:YAG laser beam to coincide with the polarization directions before entering the KAB crystal. The system described has been routinely operating for more than 6 months without any damage to the KAB crystal, thus demonstrating the attractiveness of this material for UV generation below 0.2  $\mu\text{m}$ .

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1/3,AB/2 (Item 2 from file: 2)

DIALOG(R)File 2:INSPEC

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7373280 INSPEC Abstract Number: A2002-20-4265K-034, B2002-10-4340K-043

Title: Review of research on ultraviolet and deep-UV nonlinear optical crystals in the last decade

Author(s): Chuangtian Chen

Author Affiliation: Inst. of Phys. & Chem. Technol., Chinese Acad. of Sci., Beijing, China

Conference Title: Technical Digest. CLEO/Pacific Rim 2001. 4th Pacific Rim Conference on Lasers and Electro-Optics (Cat. No.01TH8557) Part vol.2 p.11-436-7 vol.2

Publisher: IEEE, Piscataway, NJ, USA

Publication Date: 2001 Country of Publication: USA 2 vol.(xxxxii+xxxxv+651+783+47 suppl.) pp.

ISBN: 0 7803 6738 3 Material Identity Number: XX-2001-02642

Conference Title: Technical Digest. CLEO/Pacific Rim 2001. 4th Pacific Rim Conference on Lasers and Electro-Optics

Conference Sponsor: Japan Soc. Apl. Phys.; IEICE.Electron. Soc.;

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IEICE/Commun. Soc.; IEEE/Lasers & Electro-Opt. Soc.; Opt. Soc. America;  
Optoelectron. Ind. & Technol. Dev. Assoc

Conference Date: 15-19 July 2001 Conference Location: Chiba, Japan

Language: English

Abstract: Investigations on ultraviolet (UV) and deep-UV nonlinear optical (NLO) crystals over the last decade in our research group, including successes and failure, are discussed. Successes include the discovery of KBBF (KBe/sub 2/BO/sub 3/F/sub 2/) and KABO (K/sub 2/Al/sub 2/B/sub 2/O/sub 7/) crystals. By using a special prism coupling technique for KBBF, our group and Watanabe's group at the University of Tokyo have jointly shown that this crystal is suitable for fourth harmonic generation of the Ti:sapphire laser. On the other hand, we are surprised that SBBO (Sr/sub 2/Be/sub 2/B/sub 2/O/sub 7/) crystal, which has good linear and nonlinear optical properties, lacks structural completeness. As a result, the crystal has very poor optical homogeneity, and can not be used to produce deep-UV harmonic generation yet.

Subfile: A B

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1/3,AB/3 (Item 3 from file: 2)

DIALOG(R)File 2:INSPEC

(c) 2003 Institution of Electrical Engineers. All rts. reserv.

7370502 INSPEC Abstract Number: A2002-20-8110D-024, B2002-10-0510-032

Title: The crystal growth and nonlinear optical properties of K/sub 2/Al/sub 2/B/sub 2/O/sub 7/

Author(s): Zhang-Gui Hu; Ushiyama, N.; Yap, Y.K.; Yoshimura, M.; Mori, Y.; Sasaki, T.

Author Affiliation: Dept. of Electr. Eng., Osaka Univ., Japan

Journal: Journal of Crystal Growth Conference Title: J. Cryst. Growth (Netherlands) vol.237-239, no.1 p.654-7

Publisher: Elsevier,

Publication Date: April 2002 Country of Publication: Netherlands

CODEN: JCRGAE ISSN: 0022-0248

SICI: 0022-0248(200204)237/239:1L.654:CGNO;1-H

Material Identity Number: J037-2002-011

U.S. Copyright Clearance Center Code: 0022-0248/02/\$22.00

Conference Title: Thirteenth International Conference on Crystal Growth in Conjunction with the Eleventh International Conference on Vapor Growth and Epitaxy

Conference Date: 30 July-4 Aug. 2001 Conference Location: Kyoto, Japan

Language: English

Abstract: High-quality K/sub 2/Al/sub 2/B/sub 2/O/sub 7/ (KAB) crystal with a dimension of (15\*12\*4 mm/sup 3/) was grown by a modified middle-seeded solution growth method. This result allowed us to characterize nonlinear optical (NLO) properties of KAB for the generation of UV light. From our result, KAB possesses moderate birefringence for UV light generation, a significant effective NLO coefficient and is chemically as well as physically stable for practical applications.

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1/3,AB/4 (Item 4 from file: 2)

DIALOG(R)File 2:INSPEC

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7324593 INSPEC Abstract Number: A2002-17-4265K-010, B2002-08-4340K-050

Title: Efficient 266 nm ultraviolet beam generation in K/sub 2/Al/sub 2/B/sub 2/O/sub 7/ crystal

03/14/2003

Author(s): Lu Jun-Hua; Wang Gui-Ling; Xu Zu-Yan; Chen Chuang-Tian; Wang Ji-Yang; Zhang Cheng-Qian; Liu Yao-Gang

Author Affiliation: Inst. of Phys., Acad. Sinica, Beijing, China

Journal: Chinese Physics Letters vol.19, no.5 p.680-1

Publisher: Chinese Phys. Soc,

Publication Date: May 2002 Country of Publication: China

CODEN: CPLEEU ISSN: 0256-307X

SICI: 0256-307X(200205)19:5L:680:EUBG;1-6

Material Identity Number: H857-2002-005

Language: English

Abstract: An ultraviolet beam at 266 nm was obtained by fourth harmonic generation of 1064 nm Nd:YAG laser radiation through a nonlinear crystal K/sub 2/Al/sub 2/B/sub 2/O/sub 7/ (KABO). The fundamental frequency of a flash-lamp pumped Nd:YAG laser was doubled in a beta -Ba/sub 2/B/sub 2/O/sub 4/ crystal to generate a second harmonic output at a wavelength of 532 nm, and then doubled again in the KABO crystal to generate the fourth harmonic output at 266 nm. The optical conversion efficiency from 532 to 266 nm was investigated for the first time, and 13% was achieved.

Subfile: A B

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1/3,AB/5 (Item 5 from file: 2)

DIALOG(R)File 2:INSPEC

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7235193 INSPEC Abstract Number: A2002-10-8110D-015

Title: Growth of large K/sub 2/Al/sub 2/B/sub 2/O/sub 7/ crystals

Author(s): Chengqian Zhang; Jiyang Wang; Xiaobo Hu; Huaidong Jiang; Yaogang Liu; Chuangtian Chen

Author Affiliation: State Key Lab. of Crystal Mater., Shandong Univ., Jinan, China

Journal: Journal of Crystal Growth vol.235, no.1-4 p.1-4

Publisher: Elsevier,

Publication Date: Feb. 2002 Country of Publication: Netherlands

CODEN: JCRGAE ISSN: 0022-0248

SICI: 0022-0248(200202)235:1/4L:1:GLKC;1-#

Material Identity Number: J037-2002-003

U.S. Copyright Clearance Center Code: 0022-0248/02/\$22.00

Language: English

Abstract: High optical quality crystals of K/sub 2/Al/sub 2/B/sub 2/O/sub 7/ (KABO) up to 50\*20\*17 mm/sup 3/ in size and weight of 30 g have been grown using an improved top-seeded growth method with a NaF flux. The solubility data of KABO in NaF is reported over the temperature range of 920-790 degrees C and the effect of seed orientations on the crystal growth is investigated. Seed along (110) direction is the best choice for the growth of this crystal. The quality of the crystals was evaluated by synchrotron topography method and a D5000 high resolution X-ray diffractometer. The conversion efficiency of the fourth harmonic generation with a specimen 3.7 mm in length reached 12.3% for Q-switched Nd:YAG lasers.

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1/3,AB/6 (Item 6 from file: 2)

DIALOG(R)File 2:INSPEC

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7130951 INSPEC Abstract Number: A2002-03-7820L-005, B2002-02-4110-004

Title: Borate glasses with paramagnetic dopants. A new magnetooptic

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material for the IR spectral range

Author(s): Edelman, I.S.; Stepanov, S.A.; Ivantsov, R.D.; Zarubina, T.V.; Kornilova, E.E.; Vasil'ev, A.D.

Author Affiliation: Kirensky Inst. of Phys., Krasnoyarsk, Russia

Journal: Fizika i Khimiya Stekla vol.27, no.5

Publisher: MAIK Nauka,

Publication Date: Sept.-Oct. 2001 Country of Publication: Russia

CODEN: FKSTD5 ISSN: 0132-6651

Material Identity Number: C260-2001-005

Translated in: Glass Physics and Chemistry vol.27, no.5 p.454-9

Publication Date: Sept.-Oct. 2001 Country of Publication: Russia

CODEN: GPHCEE ISSN: 0360-5043

SICI of Translation: 0360-5043(200109/10)27:5L:454:BGWP;1-F

U.S. Copyright Clearance Center Code: 0360-5043/01/2705-0454\$25.00

Language: English

Abstract: The spectral, field, and temperature dependences of the magnetooptic Faraday effect and the optical absorption spectra in the IR range are measured for potassium aluminoborate glasses doped with iron, manganese, and diamagnetic metal oxides at low concentrations. It is found that the glasses are characterized by high magnitudes of the Faraday rotation and the magnetooptic figure of merit in the spectral range 1.3-1.5  $\mu$  m. The observed magnetooptic and optical properties of glasses are explained by the formation of magnetic-ordered nanosized particles that are similar to manganese ferrite in structure and properties.

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1/3,AB/7 (Item 7 from file: 2)

DIALOG(R)File 2:INSPEC

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7071933 INSPEC Abstract Number: A2001-23-8110D-002, B2001-12-0510-001

Title: Top-seeded growth of K/sub 2/Al/sub 2/B/sub 2/O/sub 7/

Author(s): Chengqian Zhang; Jiyang Wang; Xiaobo Hu; Hong Liu; Jingqian Wei; Yaogang Liu; Yicheng Wu; Chuangtian Chen

Author Affiliation: State Key Lab. of Crystal Mater., Shandong Univ., Jinan, China

Journal: Journal of Crystal Growth vol.231, no.4 p.439-41

Publisher: Elsevier,

Publication Date: Nov. 2001 Country of Publication: Netherlands

CODEN: JCRGAE ISSN: 0022-0248

SICI: 0022-0248(200111)231:4L:439:SGK;1-0

Material Identity Number: J037-2001-023

U.S. Copyright Clearance Center Code: 0022-0248/2001/\$20.00

Language: English

Abstract: New nonlinear optical crystals of the material K/sub 2/Al/sub 2/B/sub 2/O/sub 7/ (KABO) with dimensions reaching 38\*15\*10 mm/sup 3/ and weight of 11.5 g were grown by the top-seeded growth method using NaF as a flux. The morphological faces are {001}, {100} and {110}, which were characterized by X-ray diffraction methods. The problem of its layer growth habit is solved by the selection of a suitable flux. Some additional flux-systems are also discussed.

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1/3,AB/8 (Item 8 from file: 2)

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6946561 INSPEC Abstract Number: A2001-14-4265K-006, B2001-07-4340K-038  
Title: Overview of violet and deep-UV nonlinear optical crystals in the last decade

Author(s): Chen Chuang-tian

Author Affiliation: Center for Crystal Res. & Dev., Acad. Sinica, Beijing, China

Journal: Journal of Synthetic Crystals vol.30, no.1 p.36-42

Publisher: Editorial Board of J. Synthetic Crystals,

Publication Date: Feb. 2001 Country of Publication: China

CODEN: RJXUEN ISSN: 1000-985X

SICI: 1000-985X(200102)30:1L.36:OVDN;1-P

Material Identity Number: H172-2001-002

Language: Chinese

Abstract: The investigations on violet and deep-UV nonlinear optical crystals over the last decade, including successes and failures, are discussed in this paper. Successes include the discovery of KBBF crystal which produces the shortest second harmonic output (184.7 nm), and KABO crystal which has been successfully grown to centimeter size and is a promising candidate for the fourth and fifth harmonic generation of Nd:YAG laser light. However, we were surprised that the SBBO crystal which has good linear and nonlinear properties lacks structural completeness. As a result, the crystal cannot be used yet. Although we have spent about ten years on this field, the search for deep-UV nonlinear optical crystals is still not satisfactory. In the near future we will make greater efforts to improve the quality of the crystals we have discovered and will continue to search for the new ones that can overcome the problems of existing crystals.

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1/3,AB/9 (Item 9 from file: 2)

DIALOG(R)File 2:INSPEC

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6920411 INSPEC Abstract Number: A2001-12-8110D-001, B2001-06-0510-006

Title: The growth of  $K/\text{sub } 2/\text{Al}/\text{sub } 2/\text{B}/\text{sub } 2/\text{O}/\text{sub } 7/$  (KAB) crystal by modified middle seeded solution growth (MSSG) method

Author(s): Zhang-Gui Hu; Ushiyama, N.; Yoke Khin Yap; Yoshimura, M.; Mori, Y.; Sasaki, T.

Author Affiliation: Dept. of Electr. Eng., Osaka Univ., Japan

Journal: Japanese Journal of Applied Physics, Part 2 (Letters) vol.40, no.4B p.L393-5

Publisher: Japan Soc. Appl. Phys.,

Publication Date: 15 April 2001 Country of Publication: Japan

CODEN: JAPLD8 ISSN: 0021-4922

SICI: 0021-4922(20010415)40:4BL.1393:GKCM;1-2

Material Identity Number: C580-2001-008

Language: English

Abstract: Among many nonlinear optical (NLO) crystals,  $\text{Sr}/\text{sub } 2/\text{Be}/\text{sub } 2/\text{B}/\text{sub } 2/\text{O}/\text{sub } 7/$  (SBBO) and structurally related crystals is promising for the generation of UV and vacuum-UV (VUV) light. However, high viscosity, volatility and the platy growth habit have limited the growth of thick crystals for actual NLO applications. The growth of these crystals to a significant thickness has perplexed researchers in the past decade. The  $K/\text{sub } 2/\text{Al}/\text{sub } 2/\text{B}/\text{sub } 2/\text{O}/\text{sub } 7/$  (KAB) is a new NLO borate crystal discovered in our laboratory. KAB possesses a layered structure similar to SBBO and thus is another potential UV NLO crystals. We adopted a modified middle-seeded solution growth (MSSG) method to grow KAB crystals. We were able to grow high-quality, bulk KAB crystal with dimensions of  $12 \times 10 \times 6.5$  mm/sup 3/. As our knowledge, among NLO borate crystals that have similar

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structure like the SBBO crystal, KAB is the first one that can be grown to such dimension to meet the requirement for proper measurement of linear and nonlinear optical properties.

Subfile: A B

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1/3,AB/10 (Item 10 from file: 2)

DIALOG(R)File 2:INSPEC

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6802342 INSPEC Abstract Number: A2001-03-7870D-006

Title: XAFS study of the local structure of (K/sub 2/O-Al/sub 2/O/sub 3/).2B/sub 2/O/sub 3/ and (CaO-Al/sub 2/O/sub 3/).2B/sub 2/O/sub 3/ glasses

Author(s): Handa, K.; Irie, M.; Iwasaki, H.; Ohtori, N.; Umesaki, N.

Author Affiliation: Fac. of Sci. & Eng., Ritsumeikan Univ., Kyoto, Japan

Journal: Physics and Chemistry of Glasses vol.41, no.6 p.345-8

Publisher: Soc. Glass Technol,

Publication Date: Dec. 2000 Country of Publication: UK

CODEN: PCGLA6 ISSN: 0031-9090

SICI: 0031-9090(200012)41:6L:345:XSL;1-P

Material Identity Number: P080-2000-006

Language: English

Abstract: We have studied the structure of (xK/sub 2/O.yAl/sub 2/O/sub 3/).2B/sub 2/O/sub 3/ (x=0.75, 0.5, 0.45, x+y=1) and (xCaO.yAl/sub 2/O/sub 3/).2B/sub 2/O/sub 3/ (x=0.75, 0.5, 0.375, x+y=1) glasses by soft X-ray XAFS measurements. There are 6 oxygen atoms around K and Ca in (CaO-Al/sub 2/O/sub 3/).2B/sub 2/O/sub 3/ glasses and K/sub 2/O-Al/sub 2/O/sub 3/).2B/sub 2/O/sub 3/ glass and 4.2-4.7 around K in (K/sub 2/O-Al/sub 2/O/sub 3/).2B/sub 2/O/sub 3/ glasses. The mean K-O and Ca-O distances are 2.74-2.78 and 2.40-2.44 AA, respectively. The fraction of AlO/sub 6/ as AlO/sub 4/ is 53.6% in (0.75 CaO.0.25 Al/sub 2/O/sub 3/).2B/sub 2/O/sub 3/ glass and 23.3% in (0.375 CaO.0.625 Al/sub 2/O/sub 3/).2B/sub 2/O/sub 3/ glass, respectively. These results are in good agreement with our MD calculations.

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1/3,AB/11 (Item 11 from file: 2)

DIALOG(R)File 2:INSPEC

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6790154 INSPEC Abstract Number: A2001-03-4265K-001

Title: Recent development of nonlinear optical borate crystals: key materials for generation of visible and UV light

Author(s): Sasaki, T.; Mori, Y.; Yoshimura, M.; Yap, Y.K.; Kamimura, T.

Author Affiliation: Dept. of Electr. Eng., Osaka Univ., Japan

Journal: Materials Science & Engineering R: Reports vol.R30, no.1-2 p.1-54

Publisher: Elsevier,

Publication Date: 1 Nov. 2000 Country of Publication: Switzerland

CODEN: MIGIEA ISSN: 0927-796X

SICI: 0927-796X(20001101)R30:1/2L:1:RDNO;1-0

Material Identity Number: B323-2000-012

U.S. Copyright Clearance Center Code: 0927-796X/2000/\$20.00

Language: English

Abstract: The development of nonlinear optical (NLO) borate crystals for generation of visible and UV light is reviewed. We first discussed on the basic principles of laser frequency conversion. Then, we examine the trends in research on NLO crystals. The background and present status of NLO borate crystals are summarized. The main considerations are focused on the



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discussion of crystals like CsLiB/sub 6/O/sub 10/ (CLBO), Gd/sub x/Y/sub 1-x/Ca/sub 4/O(BO/sub 3)/sub 3/ (GdYCOB) and K/sub 2/Al/sub 2/B/sub 2/O/sub 7/ (KAB). Properties of related materials like beta-BaB/sub 2/O/sub 2/ (BBO), LiB/sub 3/O/sub 5/ (LBO), KBe/sub 2/BO/sub 3/F/sub 2/ (KBBF), Sr/sub 2/Be/sub 2/BO/sub 7/ (SBBO), CsB/sub 3/O/sub 5/ (CBO), GdCa/sub 4/O(BO/sub 3)/sub 3/ (GdCOB) and YCa/sub 4/O(BO/sub 3)/sub 3/ (YCOB) are included for comparison. We aim to provide a complete view of developing a new NLO borate material for actual laser applications. This review covers various aspects including the search for new materials, the growth of bulk crystals, the characterization of crystal properties as well as the development of new techniques to overcome obstacles in actual laser application, namely, thermal dephasing and laser-induced damage. Finally, perspectives on NLO borate crystals and all-solid-state UV lasers are evaluated.

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1/3,AB/12 (Item 12 from file: 2)

DIALOG(R)File 2:INSPEC

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6640041 INSPEC Abstract Number: A2000-16-8110D-015

Title: Flux growth of the new nonlinear optical crystal: K/sub 2/Al/sub 2/B/sub 2/O/sub 7/

Author(s): Hu, Z.-G.; Higashiyama, T.; Yoshimura, M.; Mori, Y.; Sasaki, T.

Author Affiliation: Dept. of Electr. Eng., Osaka Univ., Japan

Journal: Journal of Crystal Growth vol.212, no.1-2 p.368-71

Publisher: Elsevier,

Publication Date: April 2000 Country of Publication: Netherlands

CODEN: JCRGAE ISSN: 0022-0248

SICI: 0022-0248(200004)212:1/2L.368:FGNO;1-Z

Material Identity Number: J037-2000-010

U.S. Copyright Clearance Center Code: 0022-0248/2000/\$20.00

Language: English

Abstract: A new nonlinear optical K/sub 2/Al/sub 2/B/sub 2/O/sub 7/ (KAB) crystal with a dimension of 2 mm thickness was grown by top-seeded solution growth (TSSG) using K/sub 2/CO/sub 3/-B/sub 2/O/sub 3/ fluxes. The viscosity of the KAB-K/sub 2/CO/sub 3/-B/sub 2/O/sub 3/ and KAB-K/sub 2/CO/sub 3/-B/sub 2/O/sub 3/-NaF (or LiCl and KF) solutions were measured. The KAB platy growth habit, viscosity and solution homogeneity are discussed.

Subfile: A

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1/3,AB/13 (Item 13 from file: 2)

DIALOG(R)File 2:INSPEC

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6585575 INSPEC Abstract Number: A2000-12-4265K-014, B2000-06-4340K-034

Title: New nonlinear optical crystal K/sub 2/Al/sub 2/B/sub 2/O/sub 7/

Author(s): Ning Ye; Wenrong Zeng; Jie Jiang; Baichang Wu; Chuangtian Chen; Baohua Feng; Xiulan Zhang

Author Affiliation: Fujian Inst. of Res. on the Struct. of Matter, Acad. Sinica, Fuzhou, China

Journal: Journal of the Optical Society of America B (Optical Physics) vol.17, no.5 p.764-8

Publisher: Opt. Soc. America,

Publication Date: May 2000 Country of Publication: USA

03/14/2003

CODEN: JOBPDE ISSN: 0740-3224

SICI: 0740-3224(200005)17:5L:764:NOCK;1-J

Material Identity Number: G704-2000-005

U.S. Copyright Clearance Center Code: 0740-3224/2000/050764-5\$15.00

Language: English

Abstract: The new nonlinear optical crystal  $K_{2/Al_{2/}B_{2/}O_7}$  is discovered with the molecular engineering approach on the basis of anionic group theory. An optically perfect single crystal with space group  $P321$ , free of moisture and hygroscopy, is readily grown by the top-seeding flux method. Its transparence range covers 180 to 3600 nm. The refractive indices are measured with the minimum-deviation method, based on which the Sellmeier equation is obtained. The measured nonlinear optical coefficient  $d_{11}$  is 0.45 pm/V. The moderate walk-off angle and angular bandwidth, together with the high optical homogeneity, make it a promising candidate for the fourth- and the fifth-harmonic generation of a Nd:YAG laser.

Subfile: A B

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1/3,AB/14 (Item 14 from file: 2)

DIALOG(R)File 2:INSPEC

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6528719 INSPEC Abstract Number: A2000-08-4265K-023, B2000-04-4340K-083

Title: A new nonlinear optical crystal  $K_{2/Al_{2/}B_{2/}O_7}$

Author(s): Ning Ye; Wenrong Zeng; Baichang Wu; Chuangtian Chen

Author Affiliation: Fujian Inst. of Res. on the Structure of Matter, Acad. Sinica, Fuzhou, China

Conference Title: Technical Digest. Summaries of papers presented at the Conference on Lasers and Electro-Optics. Postconference Edition. CLEO '99. Conference on Lasers and Electro-Optics (IEEE Cat. No.99CH37013) p.529

Publisher: Opt. Soc. America, Washington, DC, USA

Publication Date: 1999 Country of Publication: USA 578 pp.

ISBN: 1 55752 595 1 Material Identity Number: XX-1999-02142

Conference Title: Technical Digest. Summaries of papers presented at the Conference on Lasers and Electro-Optics. Postconference Edition. CLEO '99. Conference on Lasers and Electro-Optics

Conference Sponsor: IEEE/Lasers & Electro-Opt. Soc.; OSA-Opt. Soc. America; Quantum Electron. Div. Eur. Phys. & Opt. Soc.; Japanese Quantum Electron. Joint Group

Conference Date: 23-28 May 1999 Conference Location: Baltimore, MD, USA

Language: English

Abstract: Summary form only given. Borate crystals play the important role in the field of nonlinear optical (NLO) applications, especially in the UV region. Through our endeavor to develop new NLO crystals in the last twenty years, a new familie of borate crystals were discovered to be promising candidates to break the "200-nm wall in terms of deep-UV generation". Although the difficulties of the crystal growth of this family were encountered,  $K_{2/Al_{2/}B_{2/}O_7}$  has proved to be the first crystal in this family which can be easily grown by flux method.

Subfile: A B

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1/3,AB/15 (Item 15 from file: 2)

DIALOG(R)File 2:INSPEC

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6521600 INSPEC Abstract Number: A2000-07-4265K-085, B2000-04-4340K-066

03/14/2003

Title: The development of nonlinear optical crystal K/sub 2/Al/sub 2/B/sub 2/O/sub 7/ (KAB)

Author(s): Higashiyama, T.; Zhang-Gui Hu; Yoshimura, M.; Mori, Y.; Sasaki, T.

Author Affiliation: Dept. of Eng., Osaka Univ., Japan

Conference Title: Technical Digest. CLEO/Pacific Rim '99. Pacific Rim Conference on Lasers and Electro-Optics (Cat. No.99TH8464) Part vol.1 p.102-3 vol.1

Publisher: IEEE, Piscataway, NJ, USA

Publication Date: 1999 Country of Publication: USA 4 vol. xii+1335 pp.

ISBN: 0 7803 5661 6 Material Identity Number: XX-1999-03346

U.S. Copyright Clearance Center Code: 0 7803 5661 6/99/\$10.00

Conference Title: Technical Digest. CLEO/Pacific Rim '99

Conference Sponsor: Opt. Soc. Korea; IEEE/Lasers & Electro-Opt. Soc.; Opt. Soc. America; Japan Soc. Appl. Phys.; IEICE; Korean Opt. Manuf. Assoc.; COEX(Convention & Exhibition), Seoul

Conference Date: 30 Aug.-3 Sept. 1999 Conference Location: Seoul, South Korea

Language: English

Abstract: We discovered and grew a new NLO crystal K/sub 2/Al/sub 2/B/sub 2/O/sub 7/ (KAB). KAB crystals were grown from high temperature solution in a five-zone vertical electric furnace by means of TSSG. Determined by 4-axis XRD, the KAB structure was similar to that of Sr/sub 2/Be/sub 2/B/sub 2/O/sub 7/ (SBBO). We measured the optical properties. It has moderate SHG coefficient and birefringence and wide transparency in the UV region.

Subfile: A B

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1/3,AB/16 (Item 16 from file: 2)

DIALOG(R)File 2:INSPEC

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6425220 INSPEC Abstract Number: A2000-02-6160-012

Title: Redetermination of the crystal structure of dipotassium dialuminum borate, K/sub 2/Al/sub 2/B/sub 2/O/sub 7/, a new non-linear optical material

Author(s): Hu, Z.-G.; Higashiyama, T.; Yoshimura, T.; Mori, Y.; Sasaki, T.

Author Affiliation: Dept. of Electr. Eng., Osaka City Univ., Japan

Journal: Zeitschrift fur Kristallographie - New Crystal Structures vol.214, no.4 p.433-4

Publisher: Oldenbourg,

Publication Date: 1999 Country of Publication: Germany

CODEN: ZKNSFT ISSN: 1433-7266

SICI: 1433-7266(1999)214:4L.433:RCS;1-U

Material Identity Number: G279-1999-003

Language: English

Abstract: The crystal structure data of K/sub 2/Al/sub 2/B/sub 2/O/sub 7/ are given including the XRD data, atomic coordinates and thermal displacement parameters.

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1/3,AB/17 (Item 17 from file: 2)

DIALOG(R)File 2:INSPEC

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03/14/2003

6332366 INSPEC Abstract Number: A1999-19-4265-006, B1999-10-4340-006  
Title: K/sub 2/Al/sub 2/B/sub 2/O/sub 7/: a new nonlinear optical crystal  
Author(s): Zhanggui Hu; Mori, Y.; Higashiyama, T.; Yoshimura, M.; Yap, Y.K.; Kagebayashi, Y.; Sasaki, T.  
Author Affiliation: Dept. of Electr. Eng., Osaka Univ., Japan  
Journal: Proceedings of the SPIE - The International Society for Optical Engineering Conference Title: Proc. SPIE - Int. Soc. Opt. Eng. (USA)  
vol.3556 p.156-61  
Publisher: SPIE-Int. Soc. Opt. Eng.,  
Publication Date: 1998 Country of Publication: USA  
CODEN: PSISDG ISSN: 0277-786X  
SICI: 0277-786X(1998)3556L.156:KNOC;1-R  
Material Identity Number: C574-1999-043  
U.S. Copyright Clearance Center Code: 0277-786X/98/\$10.00  
Conference Title: Electro-Optic and Second Harmonic Generation Materials, Devices, and Applications II  
Conference Sponsor: SPIE; Chinese Opt. Soc.; China Opt. & Optoelectron. Manuf. Assoc  
Conference Date: 18-19 Sept. 1998 Conference Location: Beijing, China  
Language: English  
Abstract: A new NLO crystal K/sub 2/Al/sub 2/B/sub 2/O/sub 7/ (Potassium Aluminum Borate, KAB) has been discovered. The material crystallizes in the trigonal system with  $a=8.5669(8)$  AA,  $c=8.467(1)$  AA and  $Z=3$ , KAB possesses similar space arrangement to SBBO. the KAB crystal with dimensions of  $18*14*3$  mm was grown by the flux method. The optical properties of KAB were measured.  
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1/3,AB/18 (Item 18 from file: 2)  
DIALOG(R)File 2:INSPEC  
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6332341 INSPEC Abstract Number: A1999-19-4265-003, B1999-10-4340-003  
Title: Two new nonlinear optical crystals: BaAl/sub 2/B/sub 2/O/sub 7/ and K/sub 2/Al/sub 2/B/sub 2/O/sub 7/  
Author(s): Ye Ning; Zeng Wenrong; Wu Baichang; Chen Chuangtian  
Author Affiliation: Fujian Inst. of Res. on the Struct. of Matter, Acad. Sinica, Fuzhou, China  
Journal: Proceedings of the SPIE - The International Society for Optical Engineering Conference Title: Proc. SPIE - Int. Soc. Opt. Eng. (USA)  
vol.3556 p.21-3  
Publisher: SPIE-Int. Soc. Opt. Eng.,  
Publication Date: 1998 Country of Publication: USA  
CODEN: PSISDG ISSN: 0277-786X  
SICI: 0277-786X(1998)3556L.21:NOCB;1-3  
Material Identity Number: C574-1999-043  
U.S. Copyright Clearance Center Code: 0277-786X/98/\$10.00  
Conference Title: Electro-Optic and Second Harmonic Generation Materials, Devices, and Applications II  
Conference Sponsor: SPIE; Chinese Opt. Soc.; China Opt. & Optoelectron. Manuf. Assoc  
Conference Date: 18-19 Sept. 1998 Conference Location: Beijing, China  
Language: English  
Abstract: The new nonlinear optical crystals BaAl/sub 2/B/sub 2/O/sub 7/ and K/sub 2/Al/sub 2/B/sub 2/O/sub 7/ are readily grown by top-seeded flux method. BaAl/sub 2/B/sub 2/O/sub 7/ crystallizes in the rhombohedral space group  $R\bar{3}2$  ( $Z=3$ ) in a cell of dimensions  $a=b=5.001$  AA,  $c=24.378$  AA and  $V=528.01$  AA/sup 3/. K/sub 2/Al/sub 2/B/sub 2/O/sub 7/ crystallizes in the trigonal space group  $P\bar{3}21$  ( $Z=3$ ) in a cell of dimensions  $a=b=8.530$  AA,

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$c=8.409$  AA and  $V=529.9(2)$  AA/sup 3/. The theoretical calculations and the measurement of nonlinear optical effect indicates that the two crystals are phase-matchable with the nonlinear optical coefficient  $d_{\text{sub } 11}=0.75$  pm/V for BaAl/sub 2/B/sub 2/O/sub 7/ and  $d_{\text{sub } 11}=0.48$  pm/V for K/sub 2/Al/sub 2/B/sub 2/O/sub 7/. The birefringence of BaAl/sub 2/B/sub 2/O/sub 7/ is  $\Delta n=0.063$  and  $0.068$  for K/sub 2/Al/sub 2/B/sub 2/O/sub 7/.

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1/3,AB/19 (Item 19 from file: 2)

DIALOG(R)File 2:INSPEC

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6071532 INSPEC Abstract Number: A9824-4265K-001, B9812-4340-058

Title: A new nonlinear optical borate crystal K/sub 2/Al/sub 2/B/sub 2/O/sub 7/ (KAB)

Author(s): Zhang-Gui Hu; Higashiyama, T.; Yoshimura, M.; Yoke Khin Yap; Mori, Y.; Sasaki, T.

Author Affiliation: Dept. of Electr. Eng., Osaka Univ., Japan

Journal: Japanese Journal of Applied Physics, Part 2 (Letters) vol.37, no.10A p.L1093-4

Publisher: Publication Office, Japanese Journal Appl. Phys,

Publication Date: 1 Oct. 1998 Country of Publication: Japan

CODEN: JAPLDB ISSN: 0021-4922

SICI: 0021-4922(19981001)37:10AL.11093:NOBC;1-D

Material Identity Number: C580-98018

Language: English

Abstract: A new nonlinear optical (NLO) borate crystal K/sub 2/Al/sub 2/B/sub 2/O/sub 7/ (potassium aluminum borate, KAB) has been discovered. The structure has been established by 4-axis X-ray diffraction methods. The material crystallizes in the trigonal space group  $P321$  with  $a=8.5657(9)$ AA,  $C=8.463(2)$ AA and  $Z=3$ . KAB possesses a space arrangement similar to Sr/sub 2/Be/sub 2/B/sub 2/O/sub 7/ (SBBO). A KAB crystal with a dimensions of  $30 \times 15 \times 1$  mm/sup 3/ was grown using the top-seeded solution growth (TSSG) method. The optical properties of KAB were measured.

Subfile: A B

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1/3,AB/20 (Item 20 from file: 2)

DIALOG(R)File 2:INSPEC

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4544793 INSPEC Abstract Number: A9402-8280-005

Title: Microstructural characterization by secondary ion mass spectrometry of (alumina+zirconia) fiber/glass composites with and without a tin dioxide interphase

Author(s): Chawla, K.K.; Choudhury, A.; Venkatesh, R.; Hellmann, J.R.

Author Affiliation: New Mexico Tech, Socorro, NM, USA

Journal: Materials Characterization vol.31, no.3 p.167-76

Publication Date: Oct. 1993 Country of Publication: USA

CODEN: MACHEX ISSN: 1044-5803

U.S. Copyright Clearance Center Code: 1044-5803/93/\$6.00

Language: English

Abstract: Alumina+zirconia fiber (PRD-166)/glass (N51A) matrix composites were fabricated with and without a tin dioxide barrier layer. A qualitative comparison of the elemental distribution was made between the two composite systems by secondary ion microscopy. Secondary ion mass spectrometry would appear to be especially useful to obtain the distribution of light elements such as B, Na, Cl, etc. in ceramic and glass composites. Our study of

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PRD-166/glass and PRD-166/SnO/sub 2//glass composites shows that tin dioxide serves as an effective barrier between this (alumina+zirconia) fiber and the silica-based glass.

Subfile: A

1/3,AB/21 (Item 21 from file: 2)  
DIALOG(R)File 2:INSPEC  
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04191733 INSPEC Abstract Number: A9216-7560J-004

Title: Magnetic properties of ferrite microparticles in borate glasses  
Author(s): Edelman, I.S.; Zarubina, T.V.; Stepanov, S.A.; Kim, T.A.  
Author Affiliation: L.V. Kirensky Inst. of Phys., Krasnoyarsk, Russia  
Journal: Journal of Magnetism and Magnetic Materials vol.110, no.1-2

p.99-102

Publication Date: April 1992 Country of Publication: Netherlands

CODEN: JMMDC ISSN: 0304-8853

U.S. Copyright Clearance Center Code: 0304-8853/92/\$05.00

Language: English

Abstract: The magneto-optic Faraday effect in potassium-alumina-borate glasses (with Fe/sub 2/O/sub 3/ and CoO additions made during synthesis) was studied, including its dependence on the light wavelength, external magnetic field and temperature. The unusual magnetic properties of these glasses were due to the formation of ferrimagnetic particles which behaved at certain conditions as an ensemble of noninteracting superparamagnetic particles. The dimensions, structure, composition and blocking temperature of the particles have been determined.

Subfile: A

1/3,AB/22 (Item 22 from file: 2)  
DIALOG(R)File 2:INSPEC  
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03923522 INSPEC Abstract Number: A91091799

Title: Studies of structure of K/sub 2/O-B/sub 2/O/sub 3/-Al/sub 2/O/sub 3/ glasses using the B/sup 11/NMR techniques

Author(s): Moon Sik Shim; Hae Kyoung Yang; Myoung Jin Kang; Moon Su Kim; Hyoung Lae Song; Suck Jong Chung; Hyun Tae Kim; Deog Jun Cha

Author Affiliation: Dept. of Physics, Chonnam Nat. Univ., Kwangju, South Korea

Journal: New Physics (Korean Physical Society) vol.30, no.6 p.734-8

Publication Date: Dec. 1990 Country of Publication: South Korea

CODEN: NWPYA4 ISSN: 0374-4914

Language: Korean

Abstract: The authors investigate the inner atomic structure of glasses in the ternary system K/sub 2/O-B/sub 2/O/sub 3/-Al/sub 2/O/sub 3/ using NMR. The values of N/sub 4/, the fraction of borons in the tetrahedral coordination with oxygens, were analyzed as a function of R and K (where, R=mol.% K/sub 2/O/mol.% B/sub 2/O/sub 3/, K=mol.% Al/sub 2/O/sub 3/mol.% B/sub 2/O/sub 3/). The results indicated that (1) the glasses of the R/sub 1st/ position consist mainly of dipentaborate, diborate, loose BO/sub 4/ and (B/sub 2/AlO/sub 5/)/sup -1/ units, (2) the glasses of the R/sub max/ position consist mainly of dipentaborate, diborate, metaborate and (B/sub 2/Al/sub 2/O/sub 7/)/sup -2/ units.

Subfile: A

1/3,AB/23 (Item 23 from file: 2)  
DIALOG(R)File 2:INSPEC

03/14/2003

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03315756 INSPEC Abstract Number: A89029798

Title: Effect of cerium on the properties of iron-containing potassium aluminoborate glasses

Author(s): Belozerskii, G.N.; Kalyamin, A.V.; Kornilova, E.E.; Petrovskii, T.T.; Stepanov, S.A.

Author Affiliation: A.A. Zhdanova Leningrad State Univ., USSR

Journal: Fizika i Khimiya Stekla vol.13, no.3 p.391-7

Publication Date: May-June 1987 Country of Publication: USSR

CODEN: FKSTD5 ISSN: 0132-6651

Translated in: Soviet Journal of Glass Physics and Chemistry vol.13, no.3 p.205-11

Publication Date: May-June 1987 Country of Publication: USA

CODEN: SJGCDU ISSN: 0360-5043

U.S. Copyright Clearance Center Code: 0360-5043/87/1303-0205\$12.50

Language: English

Abstract: In potassium aluminoborate glasses containing  $\text{Fe}/\text{O}$  and  $\text{CeO}/\text{O}$ , a complex compound of a garnet structure is formed on heat treatment and in this compound the positions of the rare-earth ions are occupied by cerium and iron ions. The ratio of the boron and cerium in the compound can change over a wide limit but it is only necessary to achieve some minimal concentration of cerium oxide.

Subfile: A

1/3,AB/24 (Item 24 from file: 2)

DIALOG(R)File 2:INSPEC

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03093395 INSPEC Abstract Number: A88044820

Title: Raman spectroscopic study on the glasses in the  $\text{M}/\text{O}(\text{M}'\text{O})\text{-Al}/\text{O}/\text{B}/\text{O}(\text{Ga}/\text{O})\text{-B}/\text{O}$  system

Author(s): Fukunaga, J.; Ota, R.

Author Affiliation: Dept. of Inorganic Mater., Kyoto Inst. of Technol., Japan

Journal: Journal of Non-Crystalline Solids vol.95-96, pt.1 p.271-8

Publication Date: Dec. 1987 Country of Publication: Netherlands

CODEN: JNCSEB ISSN: 0022-3093

U.S. Copyright Clearance Center Code: 0022-3093/87/\$03.50

Conference Title: Sixth International Conference on the Physics of Non-Crystalline Solids

Conference Sponsor: Int. Comm. Glass; Phys. Soc. Japan; Japan Chem. Soc.; et al

Conference Date: 6-10 July 1987 Conference Location: Kyoto, Japan

Language: English

Abstract: Raman spectra were measured on the glasses in the  $\text{M}/\text{O}(\text{M}'\text{O})\text{-Al}/\text{O}/\text{B}/\text{O}(\text{Ga}/\text{O})\text{-B}/\text{O}$  system, where  $\text{M}=\text{Li}$ ,  $\text{Na}$ , and  $\text{K}$ , and  $\text{M}'=\text{Mg}$  and  $\text{Ca}$ . It was concluded that on the addition of  $\text{Al}/\text{O}$  or  $\text{Ga}/\text{O}$  into the  $\text{M}/\text{O}(\text{M}'\text{O})\text{-B}/\text{O}$  system, tetrahedra  $\text{AlO}_4$  or  $\text{GaO}_4$  are formed while  $\text{BO}_4$  is converted to  $\text{BO}_3$ . The effect of  $\text{Ga}/\text{O}$  on the  $\text{BO}_4$  to  $\text{BO}_3$  conversion appears to be milder than that of  $\text{Al}/\text{O}$ . NMR measurement confirms the structure and the scheme of reaction deduced from the Raman spectroscopic study.

Subfile: A

1/3,AB/25 (Item 25 from file: 2)

DIALOG(R)File 2:INSPEC

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03/14/2003

02947500 INSPEC Abstract Number: A87104830

Title: Thermoradiation processes in borate glasses

Author(s): Ikramov, G.I.; Salakhitdinov, A.N.; Babayev, A.; Shodiyev, I.E.; Umarova, D.R.

Author Affiliation: Samarkand State Pedagogical Inst., Uzbek SSR, USSR

Journal: Crystal Lattice Defects and Amorphous Materials vol.13, no.3-4 p.297-304

Publication Date: 1987 Country of Publication: UK

CODEN: CLDMDJ ISSN: 0732-8699

Conference Title: All-Union Conference on Radiation Physics of Semiconductors and Non-Metal Crystals

Conference Date: 28-31 Oct. 1984 Conference Location: Tashkent, USSR

Language: English

Abstract: Experimental results are presented on the optical absorption spectra, EPR data and the chemical resistivity of borate glasses of the following compositions:  $14\text{K}/\text{sub } 2/\text{O}.86\text{B}/\text{sub } 2/\text{O}/\text{sub } 3/$ ;  $22\text{K}/\text{sub } 2/\text{O}.78\text{B}/\text{sub } 2/\text{O}/\text{sub } 3/$ ;  $22.5\text{K}/\text{sub } 2/\text{O}.22.5\text{Al}/\text{sub } 2/\text{O}/\text{sub } 3/.55\text{B}/\text{sub } 2/\text{O}/\text{sub } 3/$  and  $20\text{K}/\text{sub } 2/\text{O}.10\text{Al}/\text{sub } 2/\text{O}/\text{sub } 3/.70\text{B}/\text{sub } 2/\text{O}/\text{sub } 3/$  (mol.%) with  $\text{Fe}/\text{sub } 2/\text{O}/\text{sub } 3/$  admixtures (from 0 to 1.5 mass% above 100%) and  $\text{CuO}$  admixtures (from 0 to 1.0 mass%). Radiation and optical characteristics of gamma-irradiated samples, additionally heat-treated and melted outside the field with subsequent gamma-irradiation (in the range 0 to  $5 \cdot 10^8$  Gr) and also of the samples similarly heat-treated and melted in an intense  $^{60}\text{Co}$  (1000 R/s) radiation field (i.e. the thermoradiation treatment and melting, respectively) have been studied. The main emphasis has been given to the physical nature and interpretation of the discovered thermoradiation processes.



03/14/2003

12/3,AB/1 (Item 1 from file: 8)  
DIALOG(R)File 8: Ei Compendex(R)  
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05241317

E.I. No: EIP99034585400  
Title: New nonlinear optical borate crystal K//2Al//2B//2O//7 (KAB)  
Author: Hu, Zhang-Gui; Higashiyama, Tetsuji; Yoshimura, Masashi; Yap, Yoke Khin; Mori, Yusuke; Sasaki, Takatomo  
Corporate Source: Osaka Univ, Osaka, Jpn  
Source: Japanese Journal of Applied Physics, Part 2: Letters v 37 n 10A  
Oct 1 1998. p L1093-L1094  
Publication Year: 1998  
CODEN: JAPLD8 ISSN: 0021-4922  
Language: English  
Abstract: A new nonlinear optical (NLO) borate crystal K//2Al//2B//2O//7 (**Potassium Aluminum Borate**, KAB) has been discovered. The structure has been established by 4-axis X-ray diffraction methods. The material crystallizes in the trigonal space group P321 with a equals 8.5657(9) angstrom, C equals 8.463(2) angstrom and Z equals 3. KAB possesses a space arrangement similar to Sr//2Be//2O//7 (SBBO). A KAB crystal with a dimensions of 30 multiplied by 15 multiplied by 1 mm\*\*3 was grown using the To-Seeded Solution Growth (TSSG) Method. The optical properties of KAB were measured. (Author abstract) 11 Refs.

12/3,AB/2 (Item 2 from file: 8)  
DIALOG(R)File 8: Ei Compendex(R)  
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05238593

E.I. No: EIP99020015224  
Title: K//2Al//2B//2O//7 - a new nonlinear optical crystal  
Author: Hu, Zhanggui; Mori, Y.; Higashiyama, T.; Yoshimura, M.; Yap, Y.K.; Kagebayashi, Y.; Sasaki, T.  
Corporate Source: Osaka Univ, Osaka, Jpn  
Conference Title: Proceedings of the 1998 Conference on Electro-Optic and Second Harmonic Generation Materials, Devices, and Applications II  
Conference Location: Beijing, China Conference Date: 19980918-19980919  
E.I. Conference No.: 49756  
Source: Proceedings of SPIE - The International Society for Optical Engineering v 3556 1998. SPIE, Bellingham, WA, USA. p 156-158  
Publication Year: 1998  
CODEN: PSISDG ISSN: 0277-786X  
Language: English  
Abstract: A new NLO crystal K//2Al//2B//2O//7 (**Potassium Aluminum Borate**, KAB) has been discovered. The material crystallizes in the Trigonal system with a equals 8.5669(8) angstroms, C equals 8.467(1) angstroms and Z equals 3, KAB possesses similar space arrangement of SBBO. KAB crystal with a dimensions of 18 multiplied by 14 multiplied by 3 mm was grown by flux method. The optical properties of KAB was measured. (Author abstract) 9 Refs.

12/3,AB/3 (Item 3 from file: 8)  
DIALOG(R)File 8: Ei Compendex(R)  
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04139766

E.I. No: EIP95042671076

03/14/2003

Title: Mechanical properties of powder metallurgical aluminum matrix composites reinforced with oxide whiskers

Author: Fukaura, Kenzo; Hashimoto, Yasuhiro; Fukuda, Kazuya; Sunada, Hisakichi

Corporate Source: Himeji Inst of Technology, Himeji, Jpn

Source: Materials Transactions, JIM v 36 n 1 Jan 1995. p 65-72

Publication Year: 1995

CODEN: MTJIEY ISSN: 0916-1821

Language: English

Abstract: Tensile properties of oxide whiskers-reinforced pure aluminum matrix composites produced by powder metallurgy technique were investigated in connection with their microstructures. Reinforcements were aluminum borate, titanium oxide, and potassium titanate whiskers that were added independently to the aluminum matrix. Transmission electron microscopy characterization and the microanalysis clearly showed the interfacial reactants for every composite. The reactivities of aluminum borate and potassium titanate whiskers with pure aluminum are lower than that of titanium oxide whiskers. The interfacial reactants act as anchors to enhance the cohesive force between matrix and fillers. Therefore oxide whiskers reinforced aluminum matrix composites revealed nearly equal tensile properties to SiC whisker-reinforced aluminum matrix composite in the wide temperature range of 300 to 823 K. (Author abstract) 14 Refs.

12/3,AB/4 (Item 1 from file: 34)

DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

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05155627 Genuine Article#: VD605 Number of References: 38

Title: CONVENTIONAL AND ECCENTRIC USES OF CRYSTALLOGRAPHIC DATABASES IN PRACTICAL MATERIALS IDENTIFICATION PROBLEMS (Abstract Available)

Author(s): KADUK JA

Corporate Source: AMOCO CORP,NAPERVILLE ANALYT TECHNOL LAB SERV DIV,POB 3011,MC F-9/NAPERVILLE//IL/60566

Journal: JOURNAL OF RESEARCH OF THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY, 1996, V101, N3 (MAY-JUN), P281-294

ISSN: 1044-677X

Language: ENGLISH Document Type: ARTICLE

Abstract: The crystallographic databases are powerful and cost-effective tools for solving materials identification problems, both individually and in combination. Examples of the conventional and unconventional use of the databases in solving practical problems involving organic, coordination, and inorganic compounds are provided. The creation and use of fully-relational versions of the Powder Diffraction File and NIST Crystal Data are described.

12/3,AB/5 (Item 1 from file: 144)

DIALOG(R)File 144:Pascal

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13792005 PASCAL No.: 98-0506498

A new nonlinear optical borate crystal K SUB 2 Al SUB 2 B SUB 2 O SUB 7 (KAB)

HU Zhang-Gui; HIGASHIYAMA Tetsuji; YOSHIMURA Masashi; YAP Yoke Khin; MORI Yusuke; SASAKI Takatomo

Department of Electrical Engineering, Osaka University, 2-1 Yamadaoka, Suita, Osaka 565-0871, Japan

Journal: Japanese Journal of Applied Physics Part 1 : Regular papers, short notes & review papers, 1998-10-01, 37 (10A) L1093-L1094

Language: English

03/14/2003

A new nonlinear optical (NLO) borate crystal  $K_2Al_2B_2O_7$  (Potassium Aluminum Borate, KAB) has been discovered. The structure has been established by 4-axis X-ray diffraction methods. The material crystallizes in the trigonal space group  $P321$  with  $a=8.5657(9)$  Å,  $c=8.463(2)$  Å and  $Z=3$ . KAB possesses a space arrangement similar to  $Sr_2Be_2B_2O_7$  (SBBO). A KAB crystal with a dimensions of  $30 \times 15 \times 1$  mm<sup>3</sup> was grown using the Top-Seeded Solution Growth (TSSG) method. The optical properties of KAB were measured. (c) 1998 Publication Board, Japanese Journal of Applied Physics.

03/14/2003

14/3,AB/1 (Item 1 from file: 34)  
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci  
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11248728 Genuine Article#: 626VF Number of References: 18  
Title: A new nonlinear optical crystal-BaAlBO<sub>3</sub>F<sub>2</sub>(BABF) (ABSTRACT AVAILABLE)

Author(s): Hu ZG (REPRINT) ; Yoshimura M; Muramatsu K; Mori Y; Sasaki T  
Corporate Source: Osaka Univ,Dept Elect Engn,2-1 Yamadaoka/Suita/Osaka  
5650871/Japan/ (REPRINT); Osaka Univ,Dept Elect Engn,Suita/Osaka  
5650871/Japan/; Nikon Inc,Opto Elect Mat Res Lab, Sagamihara  
Plant,Kanagawa 2280828//Japan/

Journal: JAPANESE JOURNAL OF APPLIED PHYSICS PART 2-LETTERS, 2002, V41,  
N10B (OCT 15), PL1131-L1133

ISSN: 0021-4922 Publication date: 20021015

Publisher: INST PURE APPLIED PHYSICS, DAINI TOYOKAIJI BLDG, 4-24-8  
SHINBASHI, MINATO-KU TOKYO, 105-004, JAPAN

Language: English Document Type: ARTICLE

Abstract: We have discovered a new nonlinear optical (NLO) alumino-borate BaAlBO<sub>3</sub>F<sub>2</sub> (BABF) crystal. BABF has a structure similar to that of KBe<sub>2</sub>BO<sub>3</sub>F<sub>2</sub> (KBBF) but can easily be grown as grow large crystals and does not contain toxic elements in its composition. In this paper, we will discuss about the BABF crystal growth and its crystal structure. We have also measured its preliminary optical characteristics. BABF crystal can be grown with dimensions of 15 x 15 x 3.5 tmm(3). The UV absorption edge of BABF is very short ( 165 nm). BABF was found to have a powder second harmonic generation (SHG) efficiency about twice than that of KH<sub>2</sub>PO<sub>4</sub> (KDP). It exhibits that BABF is art excellent candidate for frequency mixing into the ultraviolet (UV).

14/3,AB/2 (Item 2 from file: 34)  
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci  
(c) 2003 Inst for Sci Info. All rts. reserv.

10771571 Genuine Article#: 567XT Number of References: 12  
Title: The crystal growth and nonlinear optical properties of

**K2Al2B2O7** (ABSTRACT AVAILABLE)

Author(s): Hu ZG (REPRINT) ; Ushiyama N; Yap YK; Yoshimura M; Mori Y;  
Sasaki T

Corporate Source: Osaka Univ,Dept Elect Engn,2-1 Yamadaoka/Suita/Osaka  
5650871/Japan/ (REPRINT); Osaka Univ,Dept Elect Engn,Suita/Osaka  
5650871/Japan/

Journal: JOURNAL OF CRYSTAL GROWTH, 2002, V237, 1 (APR), P654-657

ISSN: 0022-0248 Publication date: 20020400

Publisher: ELSEVIER SCIENCE BV, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS

Language: English Document Type: ARTICLE

Abstract: High-quality **K2Al2B2O7** (KAB) crystal with a dimension of (15 x 12 x 4 mm(3)) was grown by a modified middle-seeded solution growth method. This result allowed us to characterize nonlinear optical (NLO) properties of KAB for the generation of UV light. From our result, KAB possesses moderate birefringence for UV light generation. a significant effective NLO coefficient and is chemically as well as physically stable for practical applications. (C) 2002 Elsevier Science B.V. All rights reserved.

14/3,AB/3 (Item 3 from file: 34)  
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci  
(c) 2003 Inst for Sci Info. All rts. reserv.

03/14/2003

10674028    Genuine Article#: 555JQ    Number of References: 9  
Title: Efficient 266 nm ultraviolet beam generation in **K2A12B2O7**  
crystal (ABSTRACT AVAILABLE)  
Author(s): Lu JH (REPRINT) ; Wang GL; Xu ZY; Chen CT; Wang JY; Zhang CQ;  
Liu YG  
Corporate Source: Chinese Acad Sci, Lab Opt Phys, Inst Phys, Beijing  
100080//Peoples R China/ (REPRINT); Chinese Acad Sci, Lab Opt Phys, Inst  
Phys, Beijing 100080//Peoples R China/; Chinese Acad Sci, Beijing Ctr  
Crystal Res & Dev, Beijing 100080//Peoples R China/; Shandong Univ, State  
Key Lab Crystal Mat, Jinan 250100//Peoples R China/  
Journal: CHINESE PHYSICS LETTERS, 2002, V19, N5 (MAY), P680-681  
ISSN: 0256-307X    Publication date: 20020500  
Publisher: CHINESE PHYSICAL SOC, P O BOX 603, BEIJING 100080, PEOPLES R  
CHINA  
Language: English    Document Type: ARTICLE  
Abstract: The ultraviolet beam at 266nm was obtained by fourth harmonic  
generation of 1064 nm Nd:YAG laser radiation through a nonlinear  
Crystal **K2A12B2O7** (KABO). The fundamental frequency of a  
Bash-lamp pumped Nd:YAG laser was doubled in a beta-Ba2B2O4 Crystal to  
generate a second harmonic output at the wavelength of 532 nm, and then  
doubled again in the KABO crystal to generate the fourth harmonic  
output at 266 nm. The optical conversion efficiency from 532 to 266 nm  
was investigated for the first time, and 13% was achieved.

14/3,AB/4        (Item 4 from file: 34)  
DIALOG(R)File    34:SciSearch(R) Cited Ref Sci  
(c) 2003 Inst for Sci Info. All rts. reserv.

10367487    Genuine Article#: 519TY    Number of References: 11  
Title: Growth of large **K2A12B2O7** crystals (ABSTRACT AVAILABLE)  
Author(s): Zhang CQ; Wang JY (REPRINT) ; Hu. XB; Jiang HD; Liu YG; Chen CT  
Corporate Source: Shandong Univ, State Key Lab Crystal Mat, Jinan  
250100//Peoples R China/ (REPRINT); Shandong Univ, State Key Lab Crystal  
Mat, Jinan 250100//Peoples R China/; Chinese Acad Sci, Beijing Ctr Res &  
Dev, Beijing 10080//Peoples R China/  
Journal: JOURNAL OF CRYSTAL GROWTH, 2002, V235, N1-4 (FEB), P1-4  
ISSN: 0022-0248    Publication date: 20020200  
Publisher: ELSEVIER SCIENCE BV, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS  
Language: English    Document Type: ARTICLE  
Abstract: High optical quality crystals of **K2A12B2O7** (KABO) up to 50  
x 20 x 17 mm(3) in size and weight of 30 g have been grown using an  
improved top-seeded growth method with a NaF flux. The solubility data  
of KABO in NaF is reported over the temperature range of  
920-790degreesC and the effect of seed orientations on the crystal  
growth is investigated. Seed along (110) direction is the best choice  
for the growth of this crystal. The quality of the crystals was  
evaluated by Synchrotron topography method and a D5000 high resolution  
X-ray diffractometer. The conversion efficiency of the fourth harmonic  
generation with a specimen 3.7 mm in length reached 12.3% for  
Q-switched Nd:YAG lasers. (C) 2002 Published by Elsevier Science B.V.

14/3,AB/5        (Item 5 from file: 34)  
DIALOG(R)File    34:SciSearch(R) Cited Ref Sci  
(c) 2003 Inst for Sci Info. All rts. reserv.

10092058    Genuine Article#: 484AL    Number of References: 35  
Title: Development of new NLO borate crystals (ABSTRACT AVAILABLE)  
Author(s): Sasaki T (REPRINT) ; Mori Y; Yoshimura M

03/14/2003

Corporate Source: Osaka Univ, Grad Sch Engn, Dept Elect Engn, 2-1 Yamadaoka/Suita/Osaka 5650871/Japan/ (REPRINT); Osaka Univ, Grad Sch Engn, Dept Elect Engn, Suita/Osaka 5650871/Japan/  
Journal: JOURNAL OF NONLINEAR OPTICAL PHYSICS & MATERIALS, 2001, V10, N2 (JUN), P249-263  
ISSN: 0218-1991 Publication date: 20010600  
Publisher: WORLD SCIENTIFIC PUBL CO PTE LTD, JOURNAL DEPT PO BOX 128 FARRER ROAD, SINGAPORE 912805, SINGAPORE  
Language: English Document Type: ARTICLE  
Abstract: Interests in the use of borate crystals in ultraviolet nonlinear optics have increased because all-solid-state UV lasers obtained with NLO crystals are in highly demand for scientific and industrial applications. Recently, new borate crystals, CsLiB6O10 and GdxY1-xCa4O(BO3)(3) have been developed by the present authors. CsLiB6O10 is for fourth- and fifth-harmonic generations of Nd:YAG laser, GdxY1-xCa4O(BO3)(3) for third-harmonic generation. This paper reviews the growth and nonlinear optical properties of these new borate crystals and the progress in UV light generation.

14/3, AB/6 (Item 6 from file: 34)  
DIALOG(R) File 34:SciSearch(R) Cited Ref Sci  
(c) 2003 Inst for Sci Info. All rts. reserv.

09986253 Genuine Article#: 472BH Number of References: 10  
Title: Top-seeded growth of **K2Al2B2O7** (ABSTRACT AVAILABLE)  
Author(s): Zhang CQ; Wang JY (REPRINT) ; Hu XB; Liu H; Wei JQ; Liu YG; Wu YC; Chen CT  
Corporate Source: Shandong Univ, State Key Lab Crystal Mat, Jinan 250100//Peoples R China/ (REPRINT); Shandong Univ, State Key Lab Crystal Mat, Jinan 250100//Peoples R China/; Chinese Acad Sci, Beijing Ctr Res & Dev, Beijing 10080//Peoples R China/  
Journal: JOURNAL OF CRYSTAL GROWTH, 2001, V231, N4 (NOV), P439-441  
ISSN: 0022-0248 Publication date: 20011100  
Publisher: ELSEVIER SCIENCE BV, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS  
Language: English Document Type: ARTICLE  
Abstract: New nonlinear optical crystals of the material **K2Al2B2O7** (KABO) with dimensions reaching 38 x 15 x 10 mm(3) and weight of 11.5 g were grown by the top-seeded growth method using NaF as a flux. The morphological faces are {0 0 1}, {1 0 0} and {1 1 0}, which were characterized by X-ray diffraction methods. The problem of its layer growth habit is solved by the selection of a suitable flux. Some additional flux-systems are also discussed, (C) 2001 Elsevier Science B.V. All rights reserved.

14/3, AB/7 (Item 7 from file: 34)  
DIALOG(R) File 34:SciSearch(R) Cited Ref Sci  
(c) 2003 Inst for Sci Info. All rts. reserv.

09948969 Genuine Article#: 468UW Number of References: 21  
Title: The growth of **K2Al2B2O7** (KAB) crystal by modified middle seeded solution growth (MSSG) method (ABSTRACT AVAILABLE)  
Author(s): Hu ZG (REPRINT) ; Ushiyama N; Yap YK; Yoshimura M; Mori Y; Sasaki T  
Corporate Source: Osaka Univ, Dept Elect Engn, 2-1 Yamadaoka/Osaka 5650871//Japan/ (REPRINT); Osaka Univ, Dept Elect Engn, Osaka 5650871//Japan/  
Journal: JAPANESE JOURNAL OF APPLIED PHYSICS PART 2-LETTERS, 2001, V40, N4B (APR 15), PL393-L395  
ISSN: 0021-4922 Publication date: 20010415

03/14/2003

Publisher: INST PURE APPLIED PHYSICS, DAINI TOYOKAIJI BLDG, 4-24-8  
SHINBASHI, MINATO-KU TOKYO, 105-004, JAPAN

Language: English Document Type: ARTICLE

Abstract: Among many nonlinear optical (NLO) crystals, Sr<sub>2</sub>Be<sub>2</sub>B<sub>2</sub>O<sub>7</sub> (SBBO) and structurally related crystals is promising for the generation of UV and vacuum-UV (VUV) light. However, high viscosity, volatility and the platy growth habit have limited the growth of thick crystals for actual NLO applications. The growth of these crystals to a significant thickness has perplexed researchers in the past decade. The K<sub>2</sub>Al<sub>1</sub>B<sub>2</sub>O<sub>7</sub> (KAB) is a new NLO borate crystal discovered in our laboratory. KAB possesses a layered structure similar to SBBO and thus is another potential UV NLO crystals. We adopted a modified middle-seeded solution growth (MSSG) method to grow KAB crystals. We were able to grow high-quality, bulk KAB crystal with dimensions of 12 x 10 x 6.5 mm<sup>3</sup>. As our knowledge, among NLO borate crystals that have similar structure like the SBBO crystal, KAB is the first one that can be grown to such dimension to meet the requirement for proper measurement of linear and nonlinear optical properties.

14/3,AB/8 (Item 8 from file: 34)  
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci  
(c) 2003 Inst for Sci Info. All rts. reserv.

09466856 Genuine Article#: 408AD Number of References: 183  
Title: Recent development of nonlinear optical borate crystals: key materials for generation of visible and UV light (ABSTRACT AVAILABLE)  
Author(s): Sasaki T; Mori Y (REPRINT) ; Yoshimura M; Yap YK; Kamimura T  
Corporate Source: Osaka Univ,Dept Elect Engrn, Sasaki Lab,2-1 Yamada Oka/Suita/Osaka 5650871/Japan/ (REPRINT); Osaka Univ,Dept Elect Engrn, Sasaki Lab,Suita/Osaka 5650871/Japan/  
Journal: MATERIALS SCIENCE & ENGINEERING R-REPORTS, 2000, V30, N1-2 (NOV 1), P1-54

ISSN: 0927-796X Publication date: 20001101

Publisher: ELSEVIER SCIENCE SA, PO BOX 564, 1001 LAUSANNE, SWITZERLAND

Language: English Document Type: REVIEW

Abstract: The development of nonlinear optical (NLO) borate crystals for generation of visible and UV light is reviewed. We first discussed on the basic principles of laser frequency conversion. Then, we examine the trends in research on NLO crystals. The background and present status of NLO borate crystals are summarized. The main considerations are focused on the discussion of crystals like CsLiB<sub>6</sub>O<sub>10</sub> (CLBO), Gd<sub>2</sub>Y<sub>2</sub>Ca<sub>4</sub>O(BO<sub>3</sub>)<sub>3</sub> (GdYCOB) and K<sub>2</sub>Al<sub>2</sub>B<sub>2</sub>O<sub>7</sub> (KAB). Properties of related materials like beta-BaB<sub>2</sub>O<sub>2</sub> (BBO), LiB<sub>3</sub>O<sub>5</sub> (LBO), KBe<sub>2</sub>BO<sub>3</sub>F<sub>2</sub> (KBBF), Sr<sub>2</sub>Be<sub>2</sub>B<sub>2</sub>O<sub>7</sub> (SBBO), CsB<sub>3</sub>O<sub>5</sub> (CBO), GdCa<sub>4</sub>O(BO<sub>3</sub>)<sub>3</sub> (GdCOB) and YCa<sub>4</sub>O(BO<sub>3</sub>)<sub>3</sub> (YCOB) are included for comparison. We aim to provide a complete view of developing a new NLO borate material for actual laser applications. This review covers various aspects including the search for new materials, the growth of bulk crystals, the characterization of crystal properties as well as the development of new techniques to overcome obstacles in actual laser application, namely, thermal dephasing and laser-induced damage. Finally, perspectives on NLO borate crystals and all-solid-state UV lasers are evaluated. (C) 2000 Elsevier Science B.V. All rights reserved.

14/3,AB/9 (Item 9 from file: 34)  
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci  
(c) 2003 Inst for Sci Info. All rts. reserv.

09325835 Genuine Article#: 390YF Number of References: 1

03/14/2003

Title: New nonlinear optical crystal **K2A12B2O7** (vol B17, pg 764, 2000)  
Author(s): Ye N (REPRINT) ; Zeng WR; Jiang J; Wu BC; Chen CT; Feng BH; Zhang XL  
Corporate Source: Inst Mat Res & Engrg, 3 Res Link/Singapore 117602//Singapore/ (REPRINT); Chinese Acad Sci, Fujian Inst Res Struct Matter, Fuzhou 350002/Fujian/Peoples R China/; Chinese Acad Sci, Inst Phys, Lab Opt Phys, Beijing 100080//Peoples R China/  
Journal: JOURNAL OF THE OPTICAL SOCIETY OF AMERICA B-OPTICAL PHYSICS, 2001, V18, N1 (JAN), P122-122  
ISSN: 0740-3224 Publication date: 20010100  
Publisher: OPTICAL SOC AMER, 2010 MASSACHUSETTS AVE NW, WASHINGTON, DC 20036 USA  
Language: English Document Type: CORRECTION

14/3,AB/10 (Item 10 from file: 34)  
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci  
(c) 2003 Inst for Sci Info. All rts. reserv.

08618978 Genuine Article#: 307WX Number of References: 7  
Title: Flux growth of the new nonlinear optical crystal: **K2A12B2O7** (ABSTRACT AVAILABLE)  
Author(s): Hu ZG (REPRINT) ; Higashiyama T; Yoshimura M; Mori Y; Sasaki T  
Corporate Source: OSAKA UNIV, DEPT ELECT ENGN, 2-1 YAMADAOKA/SUITA/OSAKA 5650871/JAPAN/ (REPRINT)  
Journal: JOURNAL OF CRYSTAL GROWTH, 2000, V212, N1-2 (APR), P368-371  
ISSN: 0022-0248 Publication date: 20000400  
Publisher: ELSEVIER SCIENCE BV, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS  
Language: English Document Type: ARTICLE  
Abstract: A new nonlinear optical **K2A12B2O7** (KAB) crystal with a dimension of 2 mm thickness was grown by top-seeded solution growth (TSSG) using K2CO3-B2O3 fluxes. The viscosity of the KAB-K2CO3-B2O3 and KAB-K2CO3B2O3-NaF (or LiCl and KF) solutions were measured. The KAB platy growth habit, viscosity and solution homogeneity are discussed.  
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14/3,AB/11 (Item 11 from file: 34)  
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci  
(c) 2003 Inst for Sci Info. All rts. reserv.

08130319 Genuine Article#: 249QG Number of References: 8  
Title: Redetermination of the crystal structure of dipotassium dialuminum borate, **K2A12B2O7**, a new non-linear optical material  
Author(s): Hu ZG (REPRINT) ; Higashiyama T; Yoshimura M; Mori Y; Sasaki T  
Corporate Source: OSAKA UNIV, DEPT ELECT ENGN, 2-1 YAMADAOKA/SUITA/OSAKA 5650871/JAPAN/ (REPRINT)  
Journal: ZEITSCHRIFT FUR KRISTALLOGRAPHIE-NEW CRYSTAL STRUCTURES, 1999, V 214, N4, P433-434  
ISSN: 1433-7266 Publication date: 19990000  
Publisher: R OLDENBOURG VERLAG, LEKTORAT M/N, K BERBER-NERLINGER, POSTFACH 80 13 60, D-81613 MUNICH, GERMANY  
Language: English Document Type: ARTICLE

14/3,AB/12 (Item 12 from file: 34)  
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci  
(c) 2003 Inst for Sci Info. All rts. reserv.

07153403 Genuine Article#: 129XA Number of References: 10



03/14/2003

Title: A new nonlinear optical borate crystal **K2Al2B2O7** (KAB) (ABSTRACT AVAILABLE)  
Author(s): Hu ZG (REPRINT) ; Higashiyama T; Yoshimura M; Yap YK; Mori Y; Sasaki T  
Corporate Source: OSAKA UNIV, DEPT ELECT ENGN, 2-1 YAMADAOKA/SUITA/OSAKA 5650871/JAPAN/ (REPRINT)  
Journal: JAPANESE JOURNAL OF APPLIED PHYSICS PART 2-LETTERS, 1998, V37, N10A (OCT 1), PL1093-L1094  
Publication date: 19981001  
Publisher: JAPAN J APPLIED PHYSICS, DAINI TOYOKAIJI BLDG 24-8 SHINBASHI 4-CHOME, MINATO-KU TOKYO 105, JAPAN  
Language: English Document Type: ARTICLE  
Abstract: A new nonlinear optical (NLO) berate crystal **K2Al2B2O7** (Potassium Aluminum Berate, KAB) has been discovered. The structure has been established by 4-axis X-ray diffraction methods. The material crystallizes in the trigonal space group P321 with  $a = 8.5657(9)$  Angstrom,  $c = 8.463(2)$  Angstrom and  $Z = 3$ . KAB possesses a space arrangement similar to  $\text{Sr}_2\text{Be}_2\text{B}_2\text{O}_7$  (SBBO). A KAB crystal with a dimensions of  $30 \times 15 \times 1$  mm<sup>3</sup> was grown using the Top-Seeded Solution Growth (TSSG) method. The optical properties of KAB were measured.

14/3,AB/13 (Item 1 from file: 99)  
DIALOG(R)File 99:Wilson Appl. Sci & Tech Abs  
(c) 2003 The HW Wilson Co. All rts. reserv.

2211596 H.W. WILSON RECORD NUMBER: BAST00029659  
New nonlinear optical crystal **K2Al2B2O7**  
Ning Ye; Wenrong Zeng; Jie Jiang  
Journal of the Optical Society of America. B, Optical Physics v. 17 no5 (May 2000) p. 764-8  
DOCUMENT TYPE: Feature Article ISSN: 0740-3224

ABSTRACT: The new nonlinear optical crystal **K2Al2B2O7** is discovered with the molecular engineering approach on the basis of anionic group theory. An optically perfect single crystal with space group P321, free of moisture and hygroscopy, is readily grown by the top-seeding flux method. Its transparency range covers 180 to 3600 nm. The refractive indices are measured with the minimum-deviation method, based on which the Sellmeier equation is obtained. The measured nonlinear optical coefficient  $d_{11}$  is 0.45 pm/V. The moderate walk-off angle and angular bandwidth, together with the high optical homogeneity, make it a promising candidate for the fourth- and the fifth-harmonic generation of a Nd:YAG laser. Reprinted by permission of the publisher; copyright 2000, Optical Society of America.

14/3,AB/14 (Item 1 from file: 144)  
DIALOG(R)File 144:Pascal  
(c) 2003 INIST/CNRS. All rts. reserv.

15717450 PASCAL No.: 02-0427120  
The crystal growth and nonlinear optical properties of  $\text{K SUB 2 Al SUB 2 B SUB 2 O SUB 7}$   
ICCG-13/ICVGE-11: Proceedings of the thirteen International Conference on Crystal Growth in conjunction with the eleventh International Conference on Vapor Growth and Epitaxy, Kyoto, Japan, 30 July-4 August 2001. Part 1  
HU Zhang-Gui; USHIYAMA Naoki; YAP Yoke Khin; YOSHIMURA Masashi; MORI Yusuke; SASAKI Takatomo  
HIBIYA T, ed; MULLIN J, ed; UWAHA M, ed  
Department of Electrical Engineering, Osaka University, 2-1 Yamadaoka, Suita, Osaka 565-0871, Japan

03/14/2003

NEC Corporation, Tsukuba, Japan; EMC-HooTwo, Poole, United Kingdom;  
Nagoya University, Nagoya, Japan  
Science Council of Japan, Japan; Japan Society of Applied Physics, Japan;  
Japanese Association for Crystal Growth, Japan  
ICCG International Conference on Crystal Growth, 13ICVGE International  
Conference on Vapor Growth and Epitaxy, 11 (Kyoto JPN) 2001-07-30  
Journal: Journal of crystal growth, 2002, 237-39 (PART1) 654-657  
Language: English

High-quality K SUB 2 Al SUB 2 B SUB 2 O SUB 7 (KAB) crystal with a dimension of (15 x 12 x 4 mm SUP 3 ) was grown by a modified middle-seeded solution growth method. This result allowed us to characterize nonlinear optical (NLO) properties of KAB for the generation of UV light. From our result, KAB possesses moderate birefringence for UV light generation, a significant effective NLO coefficient and is chemically as well as physically stable for practical applications.

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14/3,AB/15 (Item 2 from file: 144)  
DIALOG(R)File 144:Pascal  
(c) 2003 INIST/CNRS. All rts. reserv.

15437322 PASCAL No.: 02-0129475  
Growth of large K SUB 2 Al SUB 2 B SUB 2 O SUB 7 crystals  
CHENGQIAN ZHANG; JIYANG WANG; XIAOBO HU; HUAIDONG JIANG; YAO GANG LIU;  
CHUANGTIAN CHEN

The State Key Laboratory of Crystal Materials, Shandong University, Jinan 250100, China; Beijing Center for Research and Development at the Chinese Academy of Sciences, Beijing 10080, China

Journal: Journal of crystal growth, 2002, 235 (1-4) 1-4

Language: English

High optical quality crystals of K SUB 2 Al SUB 2 B SUB 2 O SUB 7 (KABO) up to 50 x 20 x 17 mm SUP 3 in size and weight of 30 g have been grown using an improved top-seeded growth method with a NaF flux. The solubility data of KABO in NaF is reported over the temperature range of 920-790 Degree C and the effect of seed orientations on the crystal growth is investigated. Seed along (110) direction is the best choice for the growth of this crystal. The quality of the crystals was evaluated by Synchrotron topography method and a D5000 high resolution X-ray diffractometer. The conversion efficiency of the fourth harmonic generation with a specimen 3.7 mm in length reached 12.3% for Q-switched Nd:YAG lasers.

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14/3,AB/16 (Item 3 from file: 144)  
DIALOG(R)File 144:Pascal  
(c) 2003 INIST/CNRS. All rts. reserv.

15240396 PASCAL No.: 01-0408165  
Top-seeded growth of K SUB 2 Al SUB 2 B SUB 2 O SUB 7  
CHENGQIAN ZHANG; JIYANG WANG; XIAOBO HU; HONG LIU; JINGQIAN WEI; YAO GANG LIU; YICHENG WU; CHUANGTIAN CHEN

The State Key Laboratory of Crystal Materials, Shandong University, Jinan 250100, China; Beijing Center for Research & Development at the Chinese Academy of Sciences, Beijing 10080, China

Journal: Journal of crystal growth, 2001, 231 (4) 439-441

Language: English

New nonlinear optical crystals of the material K SUB 2 Al SUB 2 B SUB 2 O SUB 7 (KABO) with dimensions reaching 38 x 15 x 10 mm SUP 3 and weight of

03/14/2003

11.5 g were grown by the top-seeded growth method using NaF as a flux. The morphological faces are (001), (100) and (110), which were characterized by X-ray diffraction methods. The problem of its layer growth habit is solved by the selection of a suitable flux. Some additional flux-systems are also discussed.

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14/3,AB/17 (Item 4 from file: 144)  
DIALOG(R)File 144:Pascal  
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14559787 PASCAL No.: 00-0226013  
Flux growth of the new nonlinear optical crystal: K SUB 2 Al SUB 2 B SUB 2 O SUB 7  
HU Z G; HIGASHIYAMA T; YOSHIMURA M; MORI Y; SASAKI T  
Department of Electrical Engineering, Osaka University, 2-1 Yamadaoka,  
Suita, Osaka 565-0871, Japan  
Journal: Journal of crystal growth, 2000, 212 (1-2) 368-371  
Language: English  
A new nonlinear optical K SUB 2 Al SUB 2 B SUB 2 O SUB 7 (KAB) crystal with a dimension of 2 mm thickness was grown by top-seeded solution growth (TSSG) using K SUB 2 CO SUB 3 -B SUB 2 O SUB 3 fluxes. The viscosity of the KAB-K SUB 2 CO SUB 3 -B SUB 2 O SUB 3 and KAB-K SUB 2 CO SUB 3 -B SUB 2 O SUB 3 -NaF (or LiCl and KF) solutions were measured. The KAB platy growth habit, viscosity and solution homogeneity are discussed.

03/14/2003

16/3,AB/1 (Item 1 from file: 2)  
DIALOG(R)File 2:INSPEC  
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7121517 INSPEC Abstract Number: A2002-02-8160-041  
Title: The role of alteration phases in influencing the kinetics of glass dissolution  
Author(s): Wronkiewicz, D.J.; Arbesman, K.A.  
Author Affiliation: Dept. of Geol. & Geophys., Missouri Univ., Rolla, MO, USA  
Conference Title: Scientific Basis for Nuclear Waste Management XXIII. Symposium (Materials Research Society Symposium Proceedings Vol.608) p. 745-50  
Editor(s): Smith, R.W.; Shoesmith, D.W.  
Publisher: Mater. Res. Soc, Warrendale, PA, USA  
Publication Date: 2000 Country of Publication: USA xix+766 pp.  
ISBN: 1 55899 516 1 Material Identity Number: XX-2001-02500  
Conference Title: Scientific Basis for Nuclear Waste Management XXIII. Symposium  
Conference Date: 29 Nov.-2 Dec. 1999 Conference Location: Boston, MA, USA

Language: English

Abstract: The potential effect of alteration phases on the kinetics of glass corrosion has been examined in a preliminary series of Product Consistency Tests (0.5, 1, 3, 7, 35, and 91 days). Crushed samples of a relatively simple Li-Na-Ca-K-Al-B-Si glass were reacted in the presence of a relatively high ionic strength fluid, to which various, alteration phases (analcime, adularia, chabazite, or Na-montmorillonite) were added as "seed-crystals". The release of boron and lithium were used to monitor the corrosion rate of the glass. In general, corrosion rates varied only slightly between the tests with different seed-crystals types. Boron and lithium contents in tests with analcime or adularia were slightly higher than tests with Na-montmorillonite or chabazite present. Silicon concentrations did not display any consistent variation over the testing interval, remaining relatively similar to the starting leachant value of  $3.5 \times 10^{-2}$  M. The concentration of aluminum, however, decreased significantly during the first 35 days of testing and could be inversely correlated to boron and lithium concentrations. The concentration of aluminum then increased between 35 and 91 days, whereas boron and lithium concentrations remained relatively static. The noted correlation between aluminum and boron (or lithium) suggests a coupling of the rate of glass corrosion with aluminum concentration.

Subfile: A

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16/3,AB/2 (Item 1 from file: 6)  
DIALOG(R)File 6:NTIS  
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2178370 NTIS Accession Number: DE00752573/XAB  
Development of a SREX flowsheet for the separation of strontium from dissolved INEEL zirconium calcine  
Law, J. D. ; Wood, D. J. ; Todd, T. A.  
Idaho National Engineering and Environmental Lab., Idaho Falls, ID (US).  
Corp. Source Codes: 888888888  
Sponsor: Department of Energy, Washington, DC.  
Report No.: INEEL/EXT-99-00001  
1 Jan 1999 28p  
Languages: English

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Journal Announcement: USGRDR0025; NSA0039

Sponsored by Department of Energy, Washington, DC.

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NTIS Prices: PC A03/MF A01

Laboratory experimentation has indicated that the SREX process is effective for partitioning (<sup>90</sup>Sr from acidic radioactive waste solutions located at the Idaho Nuclear Technology and Engineering Center. These laboratory results were used to develop a flowsheet for countercurrent testing of the SREX process with dissolved pilot plant calcine. Testing was performed using 24 stages of 2- cm diameter centrifugal contactors which are installed in the Remote Analytical Laboratory hot cell. Dissolved Run No.64 pilot plant calcine spiked with (<sup>85</sup>Sr was used as feed solution for the testing. The flowsheet tested consisted of an extraction section 0.15 M 4(prime),4(prime)(5(prime))-di-(tert- butylcyclohexo)-18-crown-6 and 1.5 M TBP in Isopar-L., a 1.0 M NaNO(sub 3) scrub section to remove extracted K from the SREX solvent, a 0.01 M HNO(sub 3) strip section for the removal of Sr from the SREX solvent, a 0.25 M Na2CO(sub 3) wash section to remove degradation products from the solvent, and a 0.1 M HNO(sub 3) rinse section. The behavior of (<sup>85</sup>Sr, Na, K, Al, B, Ca, Cr, Fe, Ni, and Zr was evaluated. The described flowsheet successfully extracted (<sup>85</sup>Sr from the dissolved pilot plant calcine with a removal efficiency of 99.6%. Distribution coefficients for (<sup>85</sup>Sr ranged from 3.6 to 4.5 in the extraction section. With these distribution coefficients a removal efficiency of approximately 99.99% was expected. It was determined that the lower than expected removal efficiency can be attributed to a stage efficiency of only 60% in the extraction section. Extracted K was effectively scrubbed from the SREX solvent with the 1.0 M NaNO(sub 3) resulting in only 6.4% of the K in the HLW strip product. Sodium was not extracted from the dissolved calcine by the SREX solvent; however, the use of a 1.0 M NaNO(sub 3) scrub solution resulted in a Na concentration of 70 mg/L (12.3% of the feed concentration) in the HLW strip product. Al, B, Ca, Cr, Fe, Ni, and Zr were determined to be essentially inextractable.

16/3,AB/3 (Item 1 from file: 34)

DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

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06508824 Genuine Article#: YY227 Number of References: 12

Title: Multielement determination of trace elements in river water  
certified reference materials (JAC 0031, JAC 0032) by ICP-MS and  
ICP-AES with chelating resin preconcentration (ABSTRACT AVAILABLE)

Author(s): Itoh A (REPRINT) ; Iwata K; Ji S; Yabutani T; Kimata C; Sawatari  
H; Haraguchi H

Corporate Source: NAGOYA UNIV,RES CTR ADV WASTE & EMISS MANAGEMENT, CHIKUSA  
KU, FURO CHO/NAGOYA/AICHI 4648603/JAPAN/ (REPRINT); NAGOYA UNIV,GRAD  
SCH ENGN, DEPT APPL CHEM, CHIKUSA KU/NAGOYA/AICHI 4648603/JAPAN/

Journal: BUNSEKI KAGAKU, 1998, V47, N2 (FEB), P109-117

ISSN: 0525-1931 Publication date: 19980200

Publisher: JAPAN SOC ANALYTICAL CHEM, 26-2 NISHIGOTANDA 1 CHOME  
SHINAGAWA-KU, TOKYO 141, JAPAN

Language: Japanese Document Type: ARTICLE

Abstract: The multielement determination of trace elements in river water  
certified reference materials (JAC 0031 and JAC 0032), issued from the  
Japan Society for Analytical Chemistry, has been carried out by ICP-MS  
and ICP-AES. The chelating resin preconcentration method, using  
Chelex(R) 100, was employed for the enrichment of most trace elements,

03/14/2003

including rare-earth elements, while some of the elements were determined by direct sample introduction without any pretreatment. As a result, the concentrations of 37 elements in river-water certified reference materials were obtained in the present experiments. concentrations ranged from  $1.23 \times 10^{-3}$  g/l for Ca to  $1.2 \times 10^{-12}$  g/l for Tm. The analytical values for Ca, Na, Mg, K, Al, B, Fe, Cu, Zn, and Mn were almost in good agreement with the certified values, while that for Cr was not because of poor recovery in preconcentration. In addition, the REE (rare earth elements) distribution pattern of JAC 0031, normalized by the REE concentrations of continental shale, was compared with those of the Lake Biwa surface water and samples from 24 rivers in Japan.

16/3,AB/4 (Item 2 from file: 34)  
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci  
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05958409 Genuine Article#: XK390 Number of References: 7  
Title: *Treponema amylovorum* sp. nov, a saccharolytic spirochete of medium size isolated from an advanced human periodontal lesion (ABSTRACT AVAILABLE)  
Author(s): Wyss C (REPRINT) ; Choi BK; Schupbach P; Guggenheim B; Gobel UB  
Corporate Source: UNIV ZURICH, INST ORALE MIKROBIOL & ALLGEMEINE IMMUNOL, ZENTRUM ZAHN MUND & KIEFERHEILKU/CH-8028 ZURICH//SWITZERLAND/ (REPRINT) ; UNIV BERLIN, KLINIKUM CHARITE, INST MIKROBIOL & HYG/D-10117 BERLIN//GERMANY/  
Journal: INTERNATIONAL JOURNAL OF SYSTEMATIC BACTERIOLOGY, 1997, V47, N3 (JUL), P842-845  
ISSN: 0020-7713 Publication date: 19970700  
Publisher: AMER SOC MICROBIOLOGY, 1325 MASSACHUSETTS AVENUE, NW, WASHINGTON, DC 20005-4171  
Language: English Document Type: ARTICLE  
Abstract: A highly motile, medium-size, saccharolytic spirochete was isolated from an advanced human periodontal lesion in medium OMIZ-Pat supplemented with 1% human serum. The growth of this organism is dependent on either glucose, maltose, starch, or glycogen. The cells contain six endoflagella, three per pole, which overlap in the central region of the cell body. On the basis of its cell morphology and enzyme activities, as well as its sodium dodecyl sulfate-polyacrylamide gel electrophoresis protein and antigen profiles, this organism is clearly distinct from all previously cultured spirochetes. The presence of a novel species is supported by the 16S rRNA sequence of this organism, which places it in phylotype 19 of Choi et al. (B, K, Choi, B, J, Paster, F, E, Dewhirst, and U. B, Globel, Infect, Immun, 62:1889-1895, 1991). The only isolate, strain HA2P, is designated the type strain of a novel species, for which we propose the name *Treponema amylovorum*.

16/3,AB/5 (Item 1 from file: 144)  
DIALOG(R)File 144:Pascal  
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15687592 PASCAL No.: 02-0395108  
Viscoelastic indentation of silicate glasses  
SAKAI Mototsugu; SHIMIZU Satoshi; ITO Seturo  
Department of Materials Science. Toyohashi University of Technology, Tempaku-cho, Toyohashi 441-8580, Japan; Research Center, Asahi Glass Company, Ltd., 1150 Hazawa-cho, Kanagawa-ku, Yokohama 221-8755, Japan  
Journal: Journal of the American Ceramic Society, 2002, 85 (5) 1210-1216

03/14/2003

Language: English

The time-dependent viscoelastic deformation and flow of various types of silicate glasses are examined by the use of a pyramidal Berkovich indenter. It is demonstrated that a pyramidal indenter is an efficient microprobe for viscoelastic studies of glass-forming materials at temperatures near the glass transition point. Some important rheological functions of silicate glasses are determined as functions of time on the basis of a linear viscoelastic constitutive equation for pyramidal indentation. The test results are theoretically related to the dimension of flow units of these glasses, suggesting that a model of thermally fragmented silicate clusters is appropriate for consistently understanding the present rheological test results. However, the microstructural details (crystallite-like or network-like microstructures) of fragmented clusters are not inferred from the rheological information.

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16/3,AB/6 (Item 2 from file: 144)  
DIALOG(R)File 144:Pascal  
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15468854 PASCAL No.: 02-0162650

Influence of manufacturing parameters on the tensile strengths of hollow and solid glass fibres

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Journal: Journal of materials science, 2002, 37 (2) 309-315

Language: English

Composites reinforced with hollow glass fibres (HGF) have been shown to display improved performance in flexural and compressive loading over materials reinforced with solid fibres. A major drawback associated with hollow fibre composites is reduced reinforcement cross-section for a given fibre volume fraction. It is suggested that the use of optimised manufacturing parameters may allow fibre strengths to be increased, offsetting the inherent strength reduction predicted for hollow fibre composites compared to solid fibre composites. Tensile tests have been performed on batches of hollow and solid fibres with a variety of geometry's to investigate the effects of fibre hollow fraction and manufacturing parameters on fibre strength. Hollow and solid glass fibres drawn under a variety of conditions display tensile strengths which reflect their manufacturing history. A mechanism is proposed whereby differential strains may be locked into the fibre during manufacture. This mechanism may provide an explanation for the strength variations observed. Average tensile strengths for solid and hollow glass fibres appear to increase according to the degree of residual strain differential. The principal manufacturing parameters influencing residual strain differential are draw rate and temperature. Further investigation is suggested into methods for determining heat transport mechanisms within the fibre neck-down zone.

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16/3,AB/7 (Item 3 from file: 144)  
DIALOG(R)File 144:Pascal  
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15389325 PASCAL No.: 02-0077936

03/14/2003

Magnetic properties of nanocrystalline ferrite particles in an alumina-borate glass matrix

Proceedings of the Eurasian Symposium "Trends in Magnetism" EASTMAG 2001, Ekaterinburg, Russia, February 27-March 2, 2001

EDELMAN I S; IVANTSOV R D; VASILIEV A D; STEPANOV S A; KORNILOVA E E; ZARUBINA T V

Kirensky Institute of Physics, Siberian Division, Russian Academy of Sciences, Krasnoyarsk, 660036, Russia; Vavilov Optical State Institute, St. Petersburg, 192371, United States

Russian Academy of Sciences. Institute of Metal Physics, Russia

EASTMAG 2001: Eurasian Symposium "Trends in Magnetism" (Ekaterinburg RUS) 2001-02-27

Journal: Physics of metals and metallography, 2001, 91 (1 SUP) S116-S120  
Language: English

The Faraday rotation (FR) field and temperature dependencies in oxide glasses with small additions of paramagnetic metals are investigated. The formation of ferrite nanoparticles in amorphous glass matrices is revealed by X-ray diffraction. Particles have a crystalline structure similar to spinel structure, and their dimensions are about 10-24 nm. The dependencies of the FR value and its behavior in an external magnetic field on the particle dimensions are obtained. A strong FR increase upon the samples cooling (more than twice for some samples) in the temperature interval 105-273 K is observed.

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16/3,AB/8 (Item 4 from file: 144)

DIALOG(R)File 144:Pascal

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15377072 PASCAL No.: 02-0065314

Borate glasses with paramagnetic dopants: A new magneto optic material for the IR spectral range

EDELMAN I S; STEPANOV S A; IVANTSOV R D; ZARUBINA T V; KORNILOVA E E; VASIL'EV A D

Kirensky Institute of Physics, Siberian Division, Russian Academy of Sciences, Akademgorodok, Krasnoyarsk, 660036, Russia; Vavilov State Optical Institute, All-Russia Research Center, ul. Babushkina 36/1, St. Petersburg, 193171, Russia

Journal: Glass physics and chemistry, 2001, 27 (5) 454-459

Language: English

The spectral, field, and temperature dependences of the magneto optic Faraday effect and the optical absorption spectra in the IR range are measured for potassium aluminoborate glasses doped with iron, manganese, and diamagnetic metal oxides at low concentrations. It is found that the glasses are characterized by high magnitudes of the Faraday rotation and the magneto optic figure of merit in the spectral range 1.3-1.5  $\mu$  m. The observed magneto optic and optical properties of glasses are explained by the formation of magnetic-ordered nanosized particles that are similar to manganese ferrite in structure and properties.

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16/3,AB/9 (Item 5 from file: 144)

DIALOG(R)File 144:Pascal

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15143614 PASCAL No.: 01-0306535

Microwave processing of glass matrix composites containing controlled isolated porosity



03/14/2003

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Department of Materials, Imperial College of Science, Technology and  
Medicine, London SW7 2BP, United Kingdom; Department of Chemistry, Faculty  
of Engineering, University of Modena, 41100 Modena, Italy  
Journal: Journal of the European Ceramic Society, 2001, 21 (8) 1073-1080  
Language: English

Porous glass matrix composites containing well-defined spherical porosity were fabricated employing microwave-assisted densification of powder compacts. The inverse thermal gradient typical of microwave heating was used to obtain a high concentration of spherical pores in the central region of the sample and a relatively dense outer shell. Pores in the central region were formed in the molten glass phase exploiting gas evolution and entrapment. The outer region, being at a lower temperature, was sintered by viscous flow. Minimal distortion of the part occurred. The diameter of the pores showed a wide size distribution, i.e. between similar 5 and similar 50  $\mu$  m. In comparison to other methods described in the literature for the fabrication of hermetic porous materials, i.e. using hot-pressing, the present approach is advantageous due to high heating rates of microwave heating resulting in saving of time and energy. Moreover, parts of complex shape may be fabricated by this technique.

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16/3,AB/10 (Item 6 from file: 144)  
DIALOG(R)File 144:Pascal  
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15124529 PASCAL No.: 01-0286885  
Some features of leaching of two-phase alkali borosilicate glass containing PbO  
Proceedings (Proceedings) of the International Conference "Thermodynamics and Chemical Structure of Melts and Glasses", St. Petersburg, Russia, September 7-9, 1999  
ANTROPOVA T V; TSYGANOVA T A; ROSKOVA G P; KOSTYREVA I G; POLYAKOVA I G; MEDVEDEVA S V  
Grebenshchikov Institute of Silicate Chemistry, Russian Academy of Sciences, ul. Odоеvskogo 24/2, St. Petersburg, 199155, Russia  
International Conference "Thermodynamics and Chemical Structure of Melts and Glasses" (St. Petersburg RUS) 1999-09-07  
Journal: Glass physics and chemistry, 2001, 27 (2) 175-181  
Language: English

The paper reports the results of a comparative investigation into the leaching kinetics of two-phase alkali borosilicate glasses containing lead oxide in 3 M HCl solution at 100 Degree C and the glasses free from lead oxide. It is revealed that the mechanisms of leaching of the studied glasses exhibit a common feature which resides in the fact that the temporary precipitation of the products of dissolution of the glass components within the leached layer occurs as an intermediate stage of the glass leaching. Unlike glasses free from PbO, the precipitation within the porous layer of a leached lead-containing glass is observed visually, and the presence of crystalline boron-containing precipitates in this layer is confirmed by X-ray powder diffraction analysis. Compared to glasses prepared from two-phase alkali borosilicate glasses free from PbO, the porous glasses produced from two-phase glasses containing PbO are characterized by considerably smaller sizes of micropores and their larger specific surface at the same total porosity.

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16/3,AB/11 (Item 7 from file: 144)  
DIALOG(R)File 144:Pascal  
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15043981 PASCAL No.: 01-0201490  
Formation of radiation defects in high-purity silicate glasses in dependence on dopants and UV radiation sources  
NATURA Ute; EHRT Doris; NAUMANN Karin  
Otto-Schott-Institut fuer Glaschemie, Friedrich-Schiller-Universitaet Jena, Jena, Germany; SCHOTT GLAS, Mainz, Germany  
Journal: Glass science and technology : (Frankfurt), 2001, 74 (2) 23-31  
Language: English Summary Language: German  
The radiation-resistance of high-purity glasses (1 ppm iron) of the type BK7 SUP (R) , DURAN SUP (R) and lead silicate (PbS) with high transmission in the UV region was studied. The investigations were concentrated on the influence of UV-absorbing dopants on defect generation. These were refining agents, As SUB 2 O SUB 3 , Sb SUB 2 O SUB 3 , NaCl, and TiO SUB 2 as solarization suppressing agent for the visible range in BK7, and small impurities of tin ions in DURAN. The samples were irradiated with UV lamps and excimer lasers (XeCl-308 nm, KrF-248 nm, ArF-193 nm). The defect generation increases with the use of refining agents in BK7 and with the presence of small amounts of Sn SUP 2 SUP + in DURAN. The influence of TiO SUB 2 on the defect generation strongly depends on the radiation source. A model explaining the defect generation in these glasses is suggested.  
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16/3,AB/12 (Item 8 from file: 144)  
DIALOG(R)File 144:Pascal  
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15035925 PASCAL No.: 01-0193374  
Influence of lead oxide introduction into the composition of phase-separated alkali borosilicate glasses on the electrosurface characteristics of porous products of leaching  
ERMAKOVA L E; SIDOROVA M P; MEDVEDEVA S V  
Faculty of Chemistry, St. Petersburg State University Universitetskii pr. 2, Petrodvorets, 198904, Russia  
Thermodynamics and Chemical Structure of Melts and Glasses. Conference ( St. Petersburg RUS) 1999-09-07  
Journal: Glass physics and chemistry, 2001, 27 (1) 80-87  
Language: English  
A comparative investigation of the structural, adsorption, and electrokinetic characteristics of porous glasses (products of leaching of alkali borosilicate glasses with and without lead oxide) as functions of the leaching conditions and the composition of the equilibrium electrolyte solution is carried out. The introduction of PbO leads to a decrease in the radius of pores, an increase in their specific surface, and a change in the electrochemical characteristics of porous glass.

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16/3,AB/13 (Item 9 from file: 144)  
DIALOG(R)File 144:Pascal  
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15001723 PASCAL No.: 01-0157172  
XAFS study of the local structure of (K SUB 2 O-Al SUB 2 O SUB 3 ).2B SUB 2 O SUB 3 and (CaO-Al SUB 2 O SUB 3 ).2B SUB 2 O SUB 3 glasses  
Proceedings of the Third International Conference on Borate Glasses,

03/14/2003

Crystals and Melts: Structure and Applications. Part C.

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DIMITRIEV Y B, ed; WRIGHT A C, ed

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University of Chemical Technology and Metallurgy, 8 blvd Kl. Ohridski, 1756 Sofia, Bulgaria; J.J. Thomson Physical Laboratory, Reading University, Whiteknights, Reading RG6 6AF, United Kingdom

International Conference on Borate Glasses, Crystals and Melts: Structure and Applications, 3 (Sofia BGR) 2000-07-04

Journal: Physics and chemistry of glasses, 2000, 41 (6) 345-348

Language: English

We have studied the structure of  $(x\text{K}_2\text{O} \cdot y\text{Al}_2\text{O}_3)_2\text{B}_2\text{O}_3$  ( $x=0.75, 0.5, 0.45, x+y=1$ ) and  $(x\text{CaO} \cdot y\text{Al}_2\text{O}_3)_2\text{B}_2\text{O}_3$  ( $x=0.75, 0.5, 0.375, x+y=1$ ) glasses by soft x-ray XAFS measurements. There are 6 oxygen atoms around K and Ca in  $(\text{CaO} \cdot \text{Al}_2\text{O}_3)_2\text{B}_2\text{O}_3$  glasses and K SUB 2 O SUB 2 B SUB 2 O SUB 3 glass and 4.2-4.7 around K in  $(\text{K}_2\text{O} \cdot \text{Al}_2\text{O}_3)_2\text{B}_2\text{O}_3$  glasses. The mean K-O and Ca-O distances are 2.74-2.78 and 2.40-2.44 Å, respectively. The fraction of  $\text{AlO}_6$  as  $\text{AlO}_4$  is 53.6% in  $(0.75 \text{CaO} \cdot 0.25 \text{Al}_2\text{O}_3)_2\text{B}_2\text{O}_3$  glass and 23.3% in  $(0.375 \text{CaO} \cdot 0.625 \text{Al}_2\text{O}_3)_2\text{B}_2\text{O}_3$  glass, respectively. These results are in good agreement with our MD calculations.

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16/3,AB/14 (Item 10 from file: 144)

DIALOG(R)File 144:Pascal

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14634442 PASCAL No.: 00-0305190

Alkaline multicomponent phosphate glass for modification of properties by ion exchange

Proceedings of the Fifteenth University Conference on Glass Science: Structure, Properties and Applications of Phosphate and Phosphate-Containing Glasses

LIVSHITS V Y; POTALITSYN M G

BROW R, ed

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Department of Ceramic Engineering, University of Missouri-Rolla, Rolla, MO 65409, United States

University Conference on Glass Science, 15 (Missouri-Rolla USA) 1999-06-20

Journal: Journal of non-crystalline solids, 2000, 263-64 422-425

Language: English

On the basis of concepts presented on the structure of glass considered favorable for complete ion exchange of monovalent cations in the glass-salt melt' system, a composition of alkaline multicomponent phosphate glass has been proposed, which is effective in speeding the process of interdiffusion of alkaline cations. The glass of composition.  $\text{Me}_2\text{O} \cdot \text{R}_x\text{O} \cdot \text{SiO}_2 \cdot \text{P}_2\text{O}_5$  where  $\text{Me}_2\text{O} = \text{Na}_2\text{O} + \text{K}_2\text{O}$  and  $\text{R}_x\text{O} = \text{B}_2\text{O}_3 + \text{ZrO}_2 + \text{Nb}_2\text{O}_5 + \text{Al}_2\text{O}_3 + \text{SiO}_2 + \text{Nd}_2\text{O}_3$  (formula unit) has been chosen as the initial one for ion exchange. During the ion exchange, gradient diffusion layers up to 1.7 mm thick have been obtained in 8 h from a molten mixture of  $\text{Li}_2\text{SO}_4$

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and Li SUB 2 MoO SUB 4 , at temperatures above the glass transition temperature over the flat surface of a sample; the increase of the refractive index in the layer was equal to 0.027 +- 0.002.

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16/3,AB/15 (Item 11 from file: 144)  
DIALOG(R)File 144:Pascal  
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14020755 PASCAL No.: 99-0208958  
Minimum energy requirement for melting lead crystal and borosilicate glasses  
MADIVATE C  
Universidade Eduardo Mondlane, Fac. De Ciencias, Dep. De Quimica, PO Box 257, Maputo, Mozambique  
Journal: Glass technology, 1999, 40 (1) 29-32  
Language: English  
The minimum energy requirement for melting batches of a typical, laboratory borosilicate and a 24% PbO crystal glass were determined using the drop mixing method. Measurements of the heat content of cullet of the glasses were also made. The results are compared with those obtained by thermochemical calculation assuming various reaction paths and calculated values for typical soda-lime-silica glasses; the differences being discussed.

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16/3,AB/16 (Item 12 from file: 144)  
DIALOG(R)File 144:Pascal  
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13946544 PASCAL No.: 99-0129582  
En Japonais  
(Effect of solvent for wet milling on tensile properties of glass-ceramics green sheet)  
MORIYA Y; YAMADE Y  
Electronics Engineering Laboratories, Sumitomo Metal Industries Ltd., 1-8, Fuso-cho, Amagasaki-shi Hyogo 660-0891, Japan  
Journal: Nippon seramikkusu kyokai gakujuutsu ronbunshi, 1998, 106 (11) 1079-1083  
Language: Japanese Summary Language: English  
The cause of the variation of strength and elongation of glass ceramics green sheet as a function of the dispersion medium of wet milling was investigated. Green sheets were made from a mixture of glass powders ground by wet milling, ceramic fillers, plastic binder and solvent. The used glass was consisted of MgO, Al SUB 2 O SUB 3 , SiO SUB 2 , B SUB 2 O SUB 3 and K SUB 2 O. In case of using water as a dispersion medium, wet milled glass powder became porous, because MgO and B SUB 2 O SUB 3 ingredients were highly dissolved into water solvent. Therefore, it was considered that a mechanical adhesion between glass powder and binder was enhanced, and green sheet with high tensile modulus and with low elongation was produced. On the other hand, in case of using xylene as a dispersion medium, the surface area of glass powder was much smaller than that by using water, because components of the glass did not dissolve. It was considered that the adhesive strength between glass powder and binder was low so that the elongation of green sheet was the almost same as that of binder only.

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16/3,AB/17 (Item 13 from file: 144)  
DIALOG(R)File 144:Pascal  
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13506161 PASCAL No.: 98-0204464  
Composition and structure of copper halide phase in sodium and potassium  
aluminoborosilicate glasses

GOLUBKOV V V; TSEKHOMSKII V A  
Grebenshchikov Institute of Silicate Chemistry, Russian Academy of  
Sciences, ul. Odoevskogo 24/2, St. Petersburg, 199155, Russia; Vavilov  
State Optical Institute, All-Russian Research Center, ul. Babushkina 36/1,  
St. Petersburg, 193171, Russia

Journal: Glass physics and chemistry, 1998, 24 (1) 41-46

Language: English

The structure and composition of copper halide phase regions in sodium  
and potassium aluminoborosilicate glasses are investigated by the  
small-angle X-ray scattering (SAXS) technique. The influence of glass  
composition and chlorine content on the composition of copper halide phase  
is examined. It is demonstrated that the copper halide phase contains  
alkali metal halides. Upon cooling the glass below temperature of the  
primary heat treatment, the liquid breaks away from the vitreous matrix.  
This is attended by the formation of "vacuum pores" (cavities free of  
condensed material) and also by breaking of liquid drops into smaller  
droplets with the sizes responsible for the sizes of crystals and their  
melting (liquidus) and crystallization temperatures. The structure of  
copper halide phase regions depends on the thermal history of a sample,  
specifically on the heat treatments at intermediate temperatures.

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16/3,AB/18 (Item 14 from file: 144)  
DIALOG(R)File 144:Pascal  
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13456056 PASCAL No.: 98-0151512  
High temperature diffusion for the preparation of gradient index lens  
blanks

KAUFMANN A; FRISCHAT G H  
BUNDE Armin, ed; FUNKE Klaus, ed; INGRAM Malcolm D, ed  
Institut fuer Nichtmetallische Werkstoffe, Technische Universitaet  
Clausthal, Zehntnerstr. 2a, 38678 Clausthal-Zellerfeld, Germany  
Universitaet Giessen, 35392 Giessen, Germany; Universitaet Muenster,  
48149 Muenster, Germany; University of Aberdeen, Old Aberdeen AB24 3UE,  
United Kingdom

Structure Dynamics of Ionic Glasses: Experiments, Models and  
Applications. International Symposium (Schloss Rauischholzhausen DEU)  
1997-05-11

Journal: Solid state ionics, 1998, 105 (1-4) 297-302

Language: English

PbO-containing ternary and multicomponent glasses were fused together and  
reacted at temperatures between 1000 and 1500 Degree C. Those samples which  
were stable both against crystallization and convection could be evaluated  
to give an effective binary diffusion coefficient. This quantity was used  
then to set up a simple scheme to interrelate layer thickness, annealing  
time and annealing temperature for choosing a suitable multilayer glass  
package for the preparation of gradient index lens blanks. Both three-layer  
and six-layer packages were tested, and it could be shown that with a  
suitable six-layer package the gradient in PbO may be tailored as desired,

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e.g. in a linear or a parabolic way.

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16/3,AB/19 (Item 15 from file: 144)  
DIALOG(R)File 144:Pascal  
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13037013 PASCAL No.: 97-0323397  
Boron for aluminium substitution in the KAlSi SUB 2 O SUB 6 leucite structure  
MAZZA D; LUCCO BORLERA M; BRISI C; ONIDA B  
Dipartimento di Scienza dei Materiali e Ingegneria Chimica, Politecnico di Torino, Corso Duca degli Abruzzi 24, 10129 Torino, Italy  
Journal: Journal of the European Ceramic Society, 1997, 17 (7) 951-955  
Language: English  
Boron for aluminium substitution in the leucite structure (ANA-type zeolitic framework) has been examined by sol-gel preparation of different samples along the compositional junction KAl SUB ( SUB 1 SUB - SUB x SUB ) B SUB x Si SUB 2 O SUB 6 with  $0 \leq x \leq 1$ . By increasing the x value from 0 to 1 the samples crystallize, in a temperature range from 900 to 1250 Degree C, with tetragonal ( $0 \leq x \leq 0.25$ ), cubic ( $0.50 \leq x \leq 0.80$ ) and again tetragonal ( $0.90 \leq x \leq 1.00$ ) symmetry. This result for the end member with x=1 (KBSi SUB 2 O SUB 6 ) conflicts with earlier determinations. The apparent cubic symmetry, evidenced by previous data in the literature on this phase, is discussed in terms of K, B, Si imbalance in the preparations. The samples along the above junction were examined with XRD (room and high temperature), DTA, FTIR, Dilatometry; the results indicate that all the phases derive from a cubic high-temperature form by means of a displacive transition.

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16/3,AB/20 (Item 16 from file: 144)  
DIALOG(R)File 144:Pascal  
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12934564 PASCAL No.: 97-0206675  
X-ray reflectivity investigations of glass surfaces produced by float and draw techniques  
ANDERSON O; DAALDEROP G H O; BANGE K  
FRIEDBACHER Gernot, ed; GRASSERBAUER Manfred, ed; WEGSCHEIDER Wolfhard, ed  
SCHOTT Glaswerke, P.O. Box 2480, 55014 Mainz, Germany; Philips Analytical X-ray, Lelyweg 1, 7602 EA Almelo, Netherlands  
Symposium on Solid State Analysis, 8 (Vienna AUT) 1995-07-03  
Journal: Mikrochimica acta : (1966), 1997, 125 (1-4) 63-67  
Language: English  
Surfaces of soda-lime glass and borosilicate glass have been investigated by grazing incidence X-ray reflectivity (GIXR). Characteristic differences are obtained in dependence on the fabrication procedure, the composition and the cleaning procedure. Strong variation is recorded between the two soda-lime float glass surfaces while minor differences are analysed between the top and bottom side of borosilicate float glass. This is attributed to the reduced amount of tin diffused into the bottom side of the borosilicate glass surface. Different cleaning procedures generate characteristic changes on the glass surfaces which can be verified by GIXR. The results indicate that borosilicate float glass combines the merits of the good surface quality of float glass with the high chemical resistivity of

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borosilicate glass.

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16/3,AB/21 (Item 17 from file: 144)  
DIALOG(R)File 144:Pascal  
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12762947 PASCAL No.: 96-0477490  
Direct current glow discharge mass spectrometric analysis of Macor ceramic using a secondary cathode  
SCHELLES W; VAN GRIEKEN R E  
Department of Chemistry, University of Antwerp (UIA), Universiteitsplein 1, 2610 Antwerpen, Belgium  
Journal: Analytical chemistry : (Washington), 1996, 68 (20) 3570-3574  
Language: English  
A direct current glow discharge mass spectrometer has been used for the analysis of Macor, a nonconducting glass ceramic. To overcome the problem of the conductivity barrier, a tantalum secondary cathode was placed in front of the flat Macor sample. Although the sample characteristics of Macor (the electrical conductivity and the surface roughness) are very comparable to those of glass, the optimum discharge conditions for Macor analysis were found to be significantly different from those previously reported for glass. Nevertheless, successful measurements of Macor could be performed, revealing limits of detection in the sub-ppm range.

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16/3,AB/22 (Item 18 from file: 144)  
DIALOG(R)File 144:Pascal  
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12110815 PASCAL No.: 95-0340908  
Crystallization of a lithium silicate glass-ceramic under pressure  
JOHNSON S M; LAMOREAU R H; LOEHMAN R E  
SRI International, Menlo Park CA 94025, USA  
Journal: Journal of the American Ceramic Society, 1995, 78 (4) 1115-1117  
Language: English  
A lithium silicate glass has been crystallized under increasing pressure using a constant thermal cycle in a hot isostatic press. As pressure increases, the amount of cristobalite that crystallizes decreases, the amount of quartz increases, and the total volume fraction of crystalline phases increases. Crystallization without added pressure gives a mixture of lithium metasilicate, lithium disilicate, cristobalite, and residual glass; quartz is not normally observed with atmospheric-pressure crystallization. The threshold pressure for the appearance of quartz is about 50 MPa, which is in qualitative agreement with the value obtained from thermodynamic calculation. In this glass-ceramic, quartz is favored over cristobalite at high pressures because it is more dense

16/3,AB/23 (Item 19 from file: 144)  
DIALOG(R)File 144:Pascal  
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12110807 PASCAL No.: 95-0340899  
Mechanism of preventing crystallization in low-firing glass/ceramic composite substrates  
JEONG-HYUN PARK; SANG-JIN LEE

03/14/2003

Yonsei univ., dep. ceramic eng., Seoul 120-749, Republic of Korea

Journal: Journal of the American Ceramic Society, 1995, 78 (4) 1128-1130

Language: English

The formation of a crystal phase in the glass matrix of low-firing glass/ceramic composite substrates limits the efficiency of the ceramic substrate when it is used in circuit boards. In the study, adding approximately 30 vol% or more of alumina to a borosilicate-glass/ceramic composite system as a ceramic filler caused the diffusion of aluminum ions from the alumina filler into the glass matrix and prevented the formation of a cristobalite crystal phase. The diffusion distance between the aluminum ions was similar 30  $\mu$ m when the system was fired at 900 Degree C for 10 min. Raman spectroscopic analysis proved that some of the aluminum ions had diffused into the glass matrix during firing, working as a network former in the glass matrix. Raman spectra near 460 and 1100 cm SUP - SUP 1 indicate the change of network structure in the borosilicate glass. These phenomena indicate that crystallization of the borosilicate glass was prevented in the alumina-filled borosilicate system

16/3,AB/24 (Item 20 from file: 144)

DIALOG(R)File 144:Pascal

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11887789 PASCAL No.: 95-0053419

Annihilation of fast neutron defects in Li- beta -alumina ceramics

OSIRIS W G; ABD-EL-FATTAH W I

Cairo univ., fac. sci., biophysics dep., Giza, Egypt

Journal: Radiation effects and defects in solids, 1994, 128 (4) 307-314

Language: English

The effect of fast neutron bombardment (2 MeV SUP 2 SUP 5 SUP 2 Cf source) with fluence of  $1.07 \times 10^{10}$  SUP 1 SUP 0 n/cm SUP 2 on the linear thermal expansion of Li- beta -alumina ceramics was studied. Two ceramic groups in which the contents of oxides of Li, Na, K as well as B increased at the expense of alumina were prepared. Induced defects in terms of X-ray diffraction analysis were discussed to assess the use and applicability of these ceramics in neutron dosimetry. The thermal expansion data indicated that both groups exhibited reduction in the mean thermal expansion coefficient values upon irradiation

16/3,AB/25 (Item 21 from file: 144)

DIALOG(R)File 144:Pascal

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11839555 PASCAL No.: 95-0001718

Determination of boron in glass by alpha-spectrometry

SZEGEDI S; RADVANYI T

Kossuth univ., inst. exp. physics, 4001 Debrecen, Hungary

Journal: Journal of radioanalytical and nuclear chemistry, 1994, 187 (6) 409-417

Language: English

Alpha-spectrometric method has been used for the determination of boron in borosilicate glasses. For irradiation thermal neutrons with a flux of about  $10^{15}$  SUP 5 n/cm SUP 2 .s, produced in a paraffin moderator surrounding a deuteron target of a small neutron generator, were used. Alpha-particles from the reaction SUP 1 SUP 0 B (n, alpha ) were detected by a Si solid state detector with a resolution of about 50 keV. The sensitivity of the method is 0.05 wt% boron in glass samples

16/3,AB/26 (Item 22 from file: 144)



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DIALOG(R)File 144:Pascal  
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11809278 PASCAL No.: 94-0692369

Laser-induced removal of fingerprints from glass and quartz surfaces

YONG-FENG LU; KOMURO S; AOYAGI Y

National univ. Singapore, dep. electrical eng., Singapore 0511, Singapore

Journal: Japanese journal of applied physics, 1994, 33 (8 p.1) 4691-4696

Language: English

Laser removal of fingerprints from glass and quartz surfaces was studied using laser irradiation in air. The KrF excimer laser, continuous wave (CW) CO SUB 2 laser and pulsed CO SUB 2 laser were used in the investigation. Electron probe microanalysis (EPMA) was performed to characterise the substrate surfaces before and after laser cleaning. It is found that short wavelength and pulse width are necessary for fingerprint removal. EPMA measurements show that KrF excimer laser irradiation can effectively remove fingerprints from glass and quartz surfaces with a few pulses if the pulse energy density is sufficiently high

16/3,AB/27 (Item 23 from file: 144)

DIALOG(R)File 144:Pascal  
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11748800 PASCAL No.: 94-0619461

Characterization of glass-ceramic to metal bonds

ASHCROFT I A; DERBY B

Univ. Oxford, dep. materials, Osford OX1 3PH, United Kingdom

Journal: Journal of materials science, 1994, 29 (17) 4436-4446

Language: English

Glass-ceramic thick films were deposited on copper and copper/invar/copper substrates by screen printing and subsequent firing in a belt furnace. One lithium-zinc silicate glass and two lithium-aluminosilicate glasses were deposited. Microstructures of the coatings and the coating/substrate interfaces were studied using optical and electron optical techniques. SEM was used to investigate the glass-ceramic microstructure and EPMA to characterize chemical composition across the interface. Crystalline phases were identified using X-ray and electron diffraction. The lithium-aluminosilicate glass-ceramics were composed of lithium disilicate, beta -spodumene and quartz crystals in residual glass. Lithium disilicate and quartz were the only crystals identified in the lithium-zinc silicate glass-ceramic. In all the samples copper diffused extensively through the glass-ceramic during firing and formed Cu SUB 2 O precipitates in the glass-ceramics adjacent to the interface. Strong adhesion between the glass-ceramic and the substrates is promoted by copper diffusion and oxide development at the glass-ceramic/substrate interface. The strongest bonds develop when the Cu SUB 2 O forms as discrete particles rather than a continuous layer at the interface. Interfacial residual stress also influences the measured adhesion strength

16/3,AB/28 (Item 24 from file: 144)

DIALOG(R)File 144:Pascal  
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11324745 PASCAL No.: 94-0145971

En Japonais

(Sintering and mullite formation from kyanite-glass system)

TAKESHITA M; MATSUDA O; WATARI T; TORIKAI T

Saga univ., graduate school sci. eng., Honjo-machi Saga-shi 840, Japan

03/14/2003

Journal: Nippon seramikkusu kyokai gakujutsu ronbunshi, 1993, 101 (11)  
1308-1312

Summary Language: English

Sintering behavior and formation of mullite in kyanite-borosilicate glass (pyrex glass) system were examined. Kyanite decomposed to mullite and cristobalite from around 1300 Degree C. Due to this decomposition, kyanite powder compact expanded about 20 vol%, but the volume expansion of the compact decreased from 1500 Degree C. In kyanite-glass system, the volume expansion of the specimen decreased with increasing glass content. The decomposition temperature of kyanite did not change with the addition of glass. The content of mullite formed from kyanite was 71 wt% at 1550 Degree C. In the case of kyanite-glass-alumina system, the content of mullite increased by the reaction between alumina and cristobalite formed from kyanite. Mullite formed in kyanite-glass-alumina system, was columnar and about 10  $\mu\text{m}$  long. The lattice constants of mullite were close to those of references. The bending strength in kyanite 70 wt%-glass 30 wt% specimen was 135 MPa, and that in kyanite-glass-alumina system increased with sintering temperature and the value was 155 MPa at 1550 Degree C. On heating kyanite compact contacted with glass plate, needle-like mullite with an average length of 50  $\mu\text{m}$  grew into glass phase at the boundary between the compact and glass plate, but in dense part infiltrated by glass, the mullite was about 10  $\mu\text{m}$  long. It was suggested that the size of glass phase contacted to kyanite particle affected the growth of needle-like mullite crystal.

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19/3,AB/1 (Item 1 from file: 2)  
DIALOG(R)File 2:INSPEC  
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03387271 INSPEC Abstract Number: A89070941

Title: Two-level systems in the mechanical properties of silicon at low temperatures

Author(s): Keyes, R.W.

Author Affiliation: IBM Res. Div., Yorktown Heights, NY, USA

Journal: Physical Review Letters vol.62, no.11 p.1324

Publication Date: 13 March 1989 Country of Publication: USA

CODEN: PRLTAO ISSN: 0031-9007

Language: English

Abstract: Recently, Kleiman, Agnolet, and Bishop (see *ibid.*, vol.59, p.2079, 1987) (**KAB**) discovered some unexpected changes in the elastic properties of silicon at temperatures below 20 mK. They offered a plausible explanation of their observations in terms of two-level defects similar to those that have become well known in glasses. They estimated that the number of defects required to account for their observations was  $5 \times 10^{16}$  cm<sup>-3</sup>, about 1% of the concentration that produces similar effects in amorphous SiO<sub>2</sub>. In view of the facts that the experiments used silicon **crystals** of high perfection and that silicon is probably the best known and thoroughly characterized material known, this result is surprising and invites a search for alternate explanations. The author proposes that the effects discovered could be produced by a relatively small concentration of electronic defects.

Subfile: A

19/3,AB/2 (Item 1 from file: 6)  
DIALOG(R)File 6:NTIS  
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1628768 NTIS Accession Number: DE91773533

Long-term stability of high-level waste forms

Vernaz, E. ; Loida, A. ; Malow, G. ; Marples, J. A. C. ; Matzke, H. J.

CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Genie Radioactif.

Corp. Source Codes: 056141002; 1292500

Report No.: CEA-CONF-10429

1990 14p

Languages: English Document Type: Conference proceeding

Journal Announcement: GRAI9208; NSA1600

European community conference on radioactive waste management and disposal (3rd), Luxembourg (Luxembourg), 17-21 Sep 1990.

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NTIS Prices: PC A03/MF A01

The long-term stability of HLW forms is reviewed with regard to temperature, irradiation and aqueous corrosion in a geological environment. The paper focuses on borosilicate glasses, but the radiation stability results are compared with some HLW ceramics. Thermal stability: most nuclear waste glass compositions have been adjusted to ensure a low final **crystallized** fraction. The **crystallization** of highly active Pamela glass samples was similar to that of nonradioactive glass. Radiation stability: No adverse effect of irradiation damage was found in glasses doped with short-lived actinides: volume changes were small, no significant change in the leach rate was observed, and the fracture toughness

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increased. For most ceramics investigated, volume changes of up to 9%, amorphization and higher leach rates were observed as a consequence of high (alpha) decay doses. For the **KAB** 78 ceramic, however, none of these effects were detected since the matrix was not subject to (alpha) recoil damage. Chemical stability: It has been demonstrated that alteration by water depends largely on the repository conditions. Most clay act as silica sinks, and increase the glass corrosion rate. It is possible, however, to specify realistic temperature, pressure and environmental conditions to ensure glass integrity for more than 10 000 years. (ERA citation 16:016219)

19/3,AB/3 (Item 1 from file: 8)  
DIALOG(R)File 8:EI Compendex(R)  
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06061855

E.I. No: EIP02236964934  
Title: The **crystal** growth and nonlinear optical properties of  
K//2Al//2B//2O//7  
Author: Hu, Zhang-Gui; Ushiyama, Naoki; Yap, Yoke Khin; Yoshimura, Masashi; Mori, Yusuke; Sasaki, Takatomo  
Corporate Source: Department of Electrical Engineering Osaka University, Suita, Osaka 565-0871, Japan  
Source: Journal of Crystal Growth v 237-239 n 1-4 I April 2002. p 654-657  
Publication Year: 2002  
CODEN: JCRGAE ISSN: 0022-0248  
Language: English  
Abstract: High-quality K//2Al//2B//2O//7 (**KAB**) **crystal** with a dimension of (15 multiplied by 12 multiplied by 4 mm\*\*3) was grown by a modified middle-seeded solution growth method. This result allowed us to characterize nonlinear optical (NLO) properties of **KAB** for the generation of UV light. From our result, **KAB** possesses moderate birefringence for UV light generation, a significant effective NLO coefficient and is chemically as well as physically stable for practical applications. copy 2002 Elsevier Science B.V. All rights reserved. 12  
Refs.

19/3,AB/4 (Item 2 from file: 8)  
DIALOG(R)File 8:EI Compendex(R)  
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05999970

E.I. No: EIP02056846830  
Title: Review of research on ultraviolet and deep-UV nonlinear optical **crystals** in the last decade  
Author: Chen, Chuangtian  
Corporate Source: Beijing Center for Crystal R and D Inst. of Physics and Chem. Technol. Chinese Academy of Sciences, Beijing 100080, China  
Conference Title: 4th Pacific Rim Conference on Lasers and Electro-Optics  
Conference Location: Chiba, Japan Conference Date: 20010715-20010719  
E.I. Conference No.: 58980  
Source: Pacific Rim Conference on Lasers and Electro-Optics, CLEO - Technical Digest v 2 2001. p II436-II437 (IEEE cat n 01TH8557)  
Publication Year: 2001  
Language: English  
Abstract: The investigations on ultraviolet (UV) and deep UV nonlinear optical (NLO) **crystals** were discussed. The use of fourth harmonic generation of a nanosecond Ti:sapphire laser was used to obtain the shortest wavelength was presented. A conversion efficiency of 13% was achieved from from 400nm to 200 nm without surface loss correction between

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fused silica and KBBF **crystals**. **KABO crystals** with its good chemical-physical properties had been proposed for fourth and fifth harmonic generation of Nd-based lasers. (Edited abstract) 3 Refs.

19/3,AB/5 (Item 3 from file: 8)  
DIALOG(R)File 8:EI Compendex(R)  
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05997574

E.I. No: EIP02056843639  
Title: Growth of large K//2Al//2B//2O//7 **crystals**  
Author: Zhang, Chengqian; Wang, Jiyang; Hu, Xiaobo; Jiang, Huaidong; Liu, Yaogang; Chen, Chuangtian  
Corporate Source: State Key Laboratory of Crystal Mat. Shandong University, Jinan 250100, China  
Source: Journal of Crystal Growth v 235 n 1-4 February 2002. p 1-4  
Publication Year: 2002  
CODEN: JCRGAE ISSN: 0022-0248  
Language: English  
Abstract: High optical quality **crystals** of K//2Al//2B//2O//7 (**KABO**) up to 50 multiplied by 20 multiplied by 17mm\*\*3 in size and weight of 30g have been grown using an improved top-seeded growth method with a NaF flux. The solubility data of **KABO** in NaF is reported over the temperature range of 920-790 degree C and the effect of seed orientations on the **crystal** growth is investigated. Seed along (1 1 0) direction is the best choice for the growth of this **crystal**. The quality of the **crystals** was evaluated by Synchrotron topography method and a D5000 high resolution X-ray diffractometer. The conversion efficiency of the fourth harmonic generation with a specimen 3.7 mm in length reached 12.3% for Q-switched Nd:YAG lasers. copy 2002 Published by Elsevier B.V. 11 Refs.

19/3,AB/6 (Item 4 from file: 8)  
DIALOG(R)File 8:EI Compendex(R)  
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05888109

E.I. No: EIP01376646723  
Title: Top-seeded growth of K//2Al//2B//2O//7  
Author: Zhang, C.; Wang, J.; Hu, X.; Liu, H.; Wei, J.; Liu, Y.; Wu, Y.; Chen, C.  
Corporate Source: State Key Lab. of Crystal Materials Shandong University, Jinan 250100, China  
Source: Journal of Crystal Growth v 231 n 4 November 2001. p 439-441  
Publication Year: 2001  
CODEN: JCRGAE ISSN: 0022-0248  
Language: English  
Abstract: New nonlinear optical **crystals** of the material K//2Al//2B//2O//7 (**KABO**) with dimensions reaching 38 multiplied by 15 multiplied by 10 mm\*\*3 and weight of 11.5 g were grown by the top-seeded growth method using NaF as a flux. The morphological faces are left brace 0 0 1 right brace , left brace 1 0 0 right brace and left brace 1 1 0 right brace , which were characterized by X-ray diffraction methods. The problem of its layer growth habit is solved by the selection of a suitable flux. Some additional flux-systems are also discussed. copy 2001 Elsevier Science B.V. All rights reserved. 11 Refs.

19/3,AB/7 (Item 5 from file: 8)

03/14/2003

DIALOG(R)File 8: Ei Compendex(R)  
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05856413

E.I. No: EIP01306595196

Title: The growth of K//2Al//2B//2O//7 (**KAB**) crystal by modified middle seeded solution growth (MSSG) method

Author: Hu, Z.-G.; Ushiyama, N.; Yoke Khin Yap; Yoshimura, M.; Mori, Y.; Sasaki, T.

Corporate Source: Department of Electrical Engineering Osaka University, Suita, Osaka 565-0871, Japan

Source: Japanese Journal of Applied Physics, Part 2: Letters v 40 n 4 B Apr 15 2001. p L393-L395

Publication Year: 2001

CODEN: JAPLD8 ISSN: 0021-4922

Language: English

Abstract: Among many nonlinear optical (NLO) **crystals**, Sr//2Be//2B//2O//7 (SBBO) and structurally related **crystals** is promising for the generation of UV and vacuum-UV (VUV) light. However, high viscosity, volatility and the platy growth habit have limited the growth of thick **crystals** for actual NLO applications. The growth of these **crystals** to a significant thickness has perplexed researchers in the past decade. The K//2Al//2B//2O//7 (**KAB**) is a new NLO borate **crystal** discovered in our laboratory. **KAB** possesses a layered structure similar to SBBO and thus is another potential UV NLO **crystals**. We adopted a modified middle-seeded solution growth (MSSG) method to grow **KAB crystals**. We were able to grow high-quality, bulk **KAB crystal** with dimensions of 12 multiplied by 10 multiplied by 6.5 t mm\*\*3. As our knowledge, among NLO borate **crystals** that have similar structure like the SBBO **crystal**, **KAB** is the first one that can be grown to such dimension to meet the requirement for proper measurement of linear and nonlinear optical properties. 21 Refs.

19/3,AB/8 (Item 6 from file: 8)

DIALOG(R)File 8: Ei Compendex(R)  
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05766702

E.I. No: EIP01015487703

Title: Development of nonlinear optical **crystal** K//2Al//2B//2O//7 (**KAB**)

Author: Higashiyama, Tetsuji; Hu, Zhang-Gui; Yoshimura, Masashi; Mori, Yusuke; Sasaki, Takatomo

Corporate Source: Osaka Univ, Osaka, Jpn

Conference Title: Proceedings of the 1999 Pacific Rim Conference on Lasers and Electro-Optics (CLEO/PACIFIC Rim '99)

Conference Location: Seoul, South Korea Conference Date: 20990830-20990903

E.I. Conference No.: 56216

Source: Pacific Rim Conference on Lasers and Electro-Optics, CLEO - Technical Digest v 1 1999. IEEE, Piscataway, NJ, USA, 99TH8464. p 102-103

Publication Year: 1999

CODEN: 002223

Language: English

Abstract: The nonlinear optical (NLO) **crystals** LiB//3O//5 (LBO) CsB//3O//5 (CBO), KBe//2BO//3F (KBBF) and Sr//2Be//2B//2O//7 (SBBO) possess wide ultraviolet transparency and small birefringence. However, the Be element involved is toxic, which makes **crystal** growth inconvenient. A new NLO **crystal** with high optical and other qualities is required.

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The (BeO//4)\*\*6\*\* plus was replaced with (AlO//4)\*\*5\*\* plus while the Sr\*\*2\*\* plus was replaced with M\*\* plus for ionic number compensation. This enabled the discovery of a new NLO **crystal** K//2Al//2B//2O//7 which possesses a space arrangement similar to SBBO. 5 Refs.

19/3,AB/9 (Item 7 from file: 8)  
DIALOG(R)File 8: Ei Compendex(R)  
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05708703

E.I. No: EIP00115411290  
Title: Recent development of nonlinear optical borate **crystals**: Key materials for generation of visible and UV light  
Author: Sasaki, Takatomo; Mori, Yusuke; Yoshimura, Masashi; Yap, Yoke Khin; Kamimura, Tomosumi  
Corporate Source: Osaka Univ, Osaka, Jpn  
Source: Materials Science and Engineering: R: Reports v 30 n 1-2 Nov 2000. p 1-54  
Publication Year: 2000  
CODEN: MIGIEA ISSN: 0927-796X  
Language: English  
Abstract: The development of nonlinear optical (NLO) borate **crystals** for generation of visible and UV light is reviewed. We first discussed on the basic principles of laser frequency conversion. Then, we examine the trends in research on NLO **crystals**. The background and present status of NLO borate **crystals** are summarized. The main considerations are focused on the discussion of **crystals** like CsLiB//6O//1//0 (CLBO), Gd//xY//1// minus //xCa//40(BO//3)//3 (GdYCOB) and K//2Al//2B//2O//7 (**KAB**). Properties of related materials like beta -BaB//2O//2 (BBO), LiB//3O//5 (LBO), KBe//2BO//3F//2 (KBBF), Sr//2Be//2BO//7 (SBBO), CsB//3O//5 (CBO), GdCa//40(BO//3)//3 (GdCOB) and YCa//40(BO//3)//3 (YCOB) are included for comparison. We aim to provide a complete view of developing of new NLO borate material for actual laser applications. This review covers various aspects including the search for new materials, the growth of bulk **crystals**, the characterization of **crystal** properties as well as the development of new techniques to overcome obstacles in actual laser application, namely, thermal dephasing and laser-induced damage. Finally, perspectives on NLO borate **crystals** and all-solid-state UV lasers are evaluated. (Author abstract) 187 Refs.

19/3,AB/10 (Item 8 from file: 8)  
DIALOG(R)File 8: Ei Compendex(R)  
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05563503

E.I. No: EIP40055180641  
Title: Flux growth of the new nonlinear optical **crystal** : K//2Al//2B//2O//7  
Author: Hu, Zhang-Gui; Higashiyama, T.; Yoshimura, M.; Mori, Y.; Sasaki, T.  
Corporate Source: Osaka Univ, Osaka, Jpn  
Source: Journal of Crystal Growth v 212 n 1 2000. p 368-371  
Publication Year: 2000  
CODEN: JCRGAE ISSN: 0022-0248  
Language: English  
Abstract: A new nonlinear optical K//2Al//2B//2O//7 (**KAB**) **crystal** with a dimension of 2 mm thickness was grown by top-seeded solution growth (TSSG) using K//2CO//3-B//2O//3 fluxes. The viscosity of

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the **KAB-K//2CO//3-B//20//3** and **KAB-K//2CO//3-B//20//3-NaF** (or LiCl and KF) solutions were measured. The **KAB** platy growth habit, viscosity and solution homogeneity are discussed. (Author abstract) 7 Refs.

19/3,AB/11 (Item 1 from file: 34)  
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci  
(c) 2003 Inst for Sci Info. All rts. reserv.

10644365 Genuine Article#: 550DC Number of References: 76  
Title: Petrology and geochemistry of Pan-African granitoids, **Kab** Amiri area, Egypt - implications for tectonomagmatic stages in the Nubian Shield evolution (ABSTRACT AVAILABLE)  
Author(s): Moghazi AM (REPRINT)  
Corporate Source: Univ Alexandria, Fac Sci, Dept Geol, Alexandria//Egypt/ (REPRINT); Univ Alexandria, Fac Sci, Dept Geol, Alexandria//Egypt/  
Journal: MINERALOGY AND PETROLOGY, 2002, V75, N1-2, P41-67  
ISSN: 0930-0708 Publication date: 20020000  
Publisher: SPRINGER-VERLAG WIEN, SACHSENPLATZ 4-6, PO BOX 89, A-1201 VIENNA, AUSTRIA

Language: English Document Type: ARTICLE  
Abstract: Three distinctive metaluminous granitic suites have been identified from the Pan-African belt of the **Kab** Amiri area, Eastern Desert, Egypt. These are: 1) a trondhjemitetonalite suite, 2) a calc-alkaline granodiorite suite, and 3) an alkali leucogranite suite. The trondhjemitite-tonalite and the granodiorite suites resemble I-type granitoids whereas the alkali leucogranites display A-type characteristics. Geochemical attributes and field aspects indicate that three independent magmas, at different tectonic stages of the Pan-African crustal growth, are required to explain the origin of these granitoid suites. Rocks of the trondhjemitite-tonalite suite correspond to granites of the arc stage and possess a narrow range of SiO<sub>2</sub> with low K<sub>2</sub>O, Sr, Rb, Ba, Nb and Zr. Its composition is consistent with 20-30% partial melting of a primitive low-K tholeiitic source, similar to the early formed tholeiitic metavolcanics of the Egyptian basement. The granodiorite suite belongs to the collision stage and displays higher K<sub>2</sub>O, Rb, Ba, and Sr. Its magma was derived by 30-40% partial melting of LILE-enriched mafic island arc crust. The presence of abundant microdiorite enclaves in the trondhjemitite-tonalite and the granodiorite suites suggests that mantle-derived mafic magma played an important role in their petrogenesis, acting as a heat source for melting via underplating and/or intrusion. The A-type leucogranites are post-collision highly fractionated granites. They exhibit low Al<sub>2</sub>O<sub>3</sub>, MgO, CaO, TiO<sub>2</sub>, Sr, and Ba and high Rb, Nb, Y. The wide chemical variations within this suite are consistent with its evolution by fractional **crystallization** of plagioclase, K-feldspar, amphibole, Fe-Ti oxides, and apatite from a mafic magma. The parent magma was originated in the upper mantle due to crustal attenuation associated with extension in the late stage of the Pan-African crustal evolution.

19/3,AB/12 (Item 2 from file: 34)  
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci  
(c) 2003 Inst for Sci Info. All rts. reserv.

10317188 Genuine Article#: 510NA Number of References: 55  
Title: Electronic transport in quasiperiodic decagonal aluminum - art. no. 024205 (ABSTRACT AVAILABLE)  
Author(s): Krajci M (REPRINT) ; Hafner J; Mihalkovic M  
Corporate Source: Univ Vienna, Inst Mat Phys, Sensengasse 8-12/A-1090 Vienna//Austria/ (REPRINT); Univ Vienna, Inst Mat Phys, A-1090



03/14/2003

Vienna//Austria//; Univ Vienna,Ctr Computat Mat Sci,A-1090  
Vienna//Austria//; Slovak Acad Sci,Inst Phys,SK-84228  
Bratislava//Slovakia//; Tech Univ Chemnitz,Inst Phys,D-09107  
Chemnitz//Germany/

Journal: PHYSICAL REVIEW B, 2002, V6502, N2 (JAN 1), P4205-+

ISSN: 0163-1829 Publication date: 20020101

Publisher: AMERICAN PHYSICAL SOC, ONE PHYSICS ELLIPSE, COLLEGE PK, MD  
20740-3844 USA

Language: English Document Type: ARTICLE

Abstract: We present ab initio calculations of the electronic transport properties of a hypothetical monoatomic quasiperiodic system, decagonal aluminum (d-Al). Our aim is to study the influence of quasiperiodicity on the transport properties at the example of a system which is sufficiently realistic to represent real Al-based quasicrystals, but does not involve the additional complexity of a strong s,p-d hybridization which determines the properties of many **crystalline** and quasicrystalline Al-transition-metal alloys. The structure of d-Al is based on the densest known quasicrystalline sphere packing, the local atomic arrangement is closely related to **crystalline** face-centred-cubic Al. The investigation of the transport properties of a series of six periodic approximants with increasing linear dimensions is based on a self-consistent calculation of the electronic eigenstates and the **Kubo**-Greenwood formula. A detailed scaling analysis demonstrates small deviations of the eigenstates from extended behavior and shows that the transport properties belong to the sub-ballistic regime, which a scaling exponent of the electronic diffusivity of betasimilar to 0.6 that is somewhat larger than the quantum-diffusion limit ( $\beta = 0.5$ ), but distinctly smaller than for ballistic transport ( $\beta = 1$ ). In this sub-ballistic or overdiffusive regime their conductivity diverges in the thermodynamic limit, leading to metallic behavior.

19/3,AB/13 (Item 3 from file: 34)  
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci  
(c) 2003 Inst for Sci Info. All rts. reserv.

08072943 Genuine Article#: 244CF Number of References: 59

Title: In Rhodobacter sphaeroides reaction centers, mutation of proline L209 to aromatic residues in the vicinity of a water channel alters the dynamic coupling between electron and proton transfer processes (ABSTRACT AVAILABLE)

Author(s): Tandori J; Sebban P; Michel H; Baciou L (REPRINT)  
Corporate Source: CNRS,CTR MOL GENET, BAT 24/GIF SUR YVETTE//FRANCE/  
(REPRINT); CNRS,CTR MOL GENET/GIF SUR YVETTE//FRANCE//; MAX PLANCK INST  
BIOPHYS,/D-6000 FRANKFURT//GERMANY/

Journal: BIOCHEMISTRY, 1999, V38, N40 (OCT 5), P13179-13187

ISSN: 0006-2960 Publication date: 19991005

Publisher: AMER CHEMICAL SOC, 1155 16TH ST, NW, WASHINGTON, DC 20036

Language: English Document Type: ARTICLE

Abstract: The X-ray **crystallographic** structure of the photosynthetic reaction center from Rhodobacter sphaeroides obtained at high resolution has revealed a number of internal water molecules (Ermler, U., Fritzsche, G., Buchanan, S. K., and Michel, H. (1994) Structure 2, 925-936; Stowell, M. H. B., McPhillips, T. M., Rees, D. C., Soltis, S. M., Abresch, E., and Feher, G. (1997) Science 276, 812-816). Some of them are organized into distinct hydrogen-bonded water chains that connect Q(B) (the terminal quinone electron acceptor of the reaction center) to the aqueous phase. To investigate the role of the water chains in the proton conduction process, proline L209, located immediately adjacent to a water chain, was mutated to the following

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residues: F, Y, W, E, and T. We have first analyzed the effects of the mutations on the kinetic and thermodynamic properties of the rate constants of the second electron transfer ( $k(\text{AB})(2)$ ) and of the coupled proton uptake ( $k(\text{H}^+)$ ) at the second flash. In all aromatic mutants,  $k(\text{AB})(2)$  and  $k(\text{H}^+)$  are notably and concomitantly decreased compared to the wild-type, while no effect is observed in the other mutants. The temperature dependence of these rates, shows activation energy values ( $\Delta H$  double dagger) similar for the proton and electron-transfer processes in the wild-type and in most of the mutants, except for the L209PW and L209PF mutants. The analysis of the enthalpy factors related to the electron and proton-transfer processes in the L209PF and the L209PW mutants allows to distinguish the respective effects of the mutations for both transfer reactions. It is noteworthy that in the aromatic mutants a substantial increase of the free energies of activation is observed ( $\Delta G$  double dagger(L209PY) <  $\Delta G$  double dagger(L209PF) <  $\Delta G$  double dagger(L209PW)) for both proton and electron-transfer reactions, while in the other mutants,  $\Delta G$  double dagger is not affected. The salt concentration dependence of  $k_{\text{AB}}(2)$  shows, in the L209PF and L209PW mutants, a higher screening of the protein surface potential experienced by Q(B). Our data suggest that residues F and W in position L209 increase the polarizability of the internal water molecules and polar residues by altering the organization of the hydrogen-bond network. We have also analyzed the rates of the first electron-transfer reaction ( $k(\text{AB})(1)$ ), in the 100  $\mu\text{s}$  time domain. These kinetics have previously been shown to reflect protein relaxation events possibly including proton uptake events (Tiede, D. M., Vazquez, J., Cordova, J., and Marone, P. M. (1996) Biochemistry 35, 10763-10775). Interestingly, in the L209PF and L209PW mutants,  $k_{\text{AB}}(1)$  is notably decreased in comparison to the wild type and the other mutants, in a similar way as  $k(\text{AB})(2)$  and  $k(\text{H}^+)$ . Our data imply that the dynamic organization of this web is tightly coupled to the electron transfer process that is kinetically limited by protonation events and/or conformational rearrangements within the protein.

19/3,AB/14 (Item 1 from file: 94)  
DIALOG(R)File 94:JICST-EPlus  
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03858950 JICST ACCESSION NUMBER: 99A0178722 FILE SEGMENT: PreJICST-E  
Development of new nonlinear optical **crystal**, **KAB**.  
HIGASHIYAMA TETSUJI (1); HU Z-G (1); MORI YUUSUKE (1); SASAKI TAKATOMO (1)  
(1) Osaka Univ., Grad. Sch.  
Oyo Butsuri Gakkai Gakujutsu Koenkai Koen Yokoshu, 1998, VOL.59th,NO.1,  
PAGE.212  
JOURNAL NUMBER: Y0055AAA  
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan  
DOCUMENT TYPE: Conference Proceeding  
MEDIA TYPE: Printed Publication

19/3,AB/15 (Item 2 from file: 94)  
DIALOG(R)File 94:JICST-EPlus  
(c)2003 Japan Science and Tech Corp(JST). All rts. reserv.

03383059 JICST ACCESSION NUMBER: 97A0998360 FILE SEGMENT: JICST-E  
In-Plane and Out-of-Plane Thermal Conductivities of a Large Single  
**Crystal** of  $\text{NdBa}_2\text{Cu}_3\text{O}_{7-x}$  Prepared by the Top-Seeded  
Solution-Growth Method.  
MATSUKAWA M (1); IWASAKI K (1); SATO H (1); NOTO K (1); YAO X (2); SHIOHARA

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Y (2); KOBAYASHI N (3)

(1) Iwate Univ., Morioka, JPN; (2) ISTEK, Tokyo, JPN; (3) Tohoku Univ., Sendai, JPN

Mater Trans JIM(Jpn Inst Met), 1997, VOL.38,NO.9, PAGE.745-748, FIG.5, REF.27

JOURNAL NUMBER: G0668ABL ISSN NO: 0916-1821

UNIVERSAL DECIMAL CLASSIFICATION: 537.312.62:546-31

LANGUAGE: English COUNTRY OF PUBLICATION: Japan

DOCUMENT TYPE: Journal

ARTICLE TYPE: Original paper

MEDIA TYPE: Printed Publication

ABSTRACT: The in-plane and out-of-plane thermal conductivities, **K<sub>ab</sub>** and **K<sub>c</sub>**, of a large single **crystal** of NdBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-x</sub>(NBCO) prepared by the top-seeded solution-growth method has been studied for the first time as functions of temperature and magnetic field up to high fields of 14 T. The **K<sub>ab</sub>** value of the annealed sample shows a rapid enhancement associated with the superconducting transition which is widely observed for high-TC superconductors. The magnetic field dependence of **K<sub>ab</sub>** of a single **crystal** of NBCO has been examined with the field applied along the c-axis. It was found that at low fields, the **K<sub>ab</sub>** value of the NBCO compound first decreases rapidly and then gradually at high fields. Such nonlinear field dependence of **K<sub>ab</sub>** has been reported not only for RBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-x</sub>(R=rare earth ion) but also Bi-2212 and Bi-2223 compounds. (author abst.)

19/3,AB/16 (Item 1 from file: 99)

DIALOG(R)File 99:Wilson Appl. Sci & Tech Abs

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1797025 H.W. WILSON RECORD NUMBER: BAST95056034

Anomalous phonon damping in insulating cuprates

Cohn, Joshua L;

Journal of Superconductivity v. 8 (Aug. '95) p. 457-60

DOCUMENT TYPE: Feature Article ISSN: 0896-1107

ABSTRACT: Part of a special issue on the University of Miami Workshop on High-Temperature Superconductivity. Measurements of the in-plane (**k<sub>ab</sub>**) and out-of-plane (**k<sub>c</sub>**) thermal conductivity for insulating cuprate **crystals** are considered along with new measurements for YBa<sub>2</sub>Cu<sub>3</sub>O<sub>6</sub> and PrBa<sub>2</sub>Cu<sub>3</sub>O<sub>6</sub>, where **k<sub>ab</sub>** and **k<sub>c</sub>** are double the magnitude previously reported for this material. Measurements of **k<sub>ab</sub>** in insulating cuprates should provide assistance in placing limits on the phonon contribution and phonon scattering mechanisms relevant to superconducting compositions. An unusual temperature dependence of **k<sub>ab</sub>** in cuprates with apical oxygen suggested the onset of strong phonon damping for T<200-250 K. Along with dielectric and elastic anomalies reported in this regime, the results indicated the occurrence of a structural phase transition, involving rotations of the CuO polyhedra about an in-plane axis.

19/3,AB/17 (Item 2 from file: 99)

DIALOG(R)File 99:Wilson Appl. Sci & Tech Abs

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1614821 H.W. WILSON RECORD NUMBER: BAST98006264

Combined X-ray diffraction and <sup>15</sup>N CPMAS NMR study of molecular structure and proton order/disorder phenomena in cyclic N,N'-bis(aryl)formamidinium dimers

03/14/2003

Anulewicz, Romana; Wawer, Iwona; Krygowski, Tadeusz Marek  
Journal of the American Chemical Society v. 119 (Dec. 17 '97) p. 12223-30  
DOCUMENT TYPE: Feature Article ISSN: 0002-7863

**ABSTRACT:** **Crystal** structures of a series of five symmetrically substituted N,N-bisarylformamidines  $\text{ArNH-CH}[\text{double bond}]\text{NAr}$  with  $\text{Ar} = \text{X-C}_6\text{H}_4$ ,  $\text{X} = \text{p-OCH}_3$  (IV),  $\text{p-CH}_3$  (V),  $\text{p-F}$  (VI),  $\text{p-NO}_2$  (VII), and  $\text{m-Br}$  (VIII) have been determined by single-**crystal** X-ray diffraction (XRD) and complete the series studied previously where  $\text{X} = \text{H}$  (I),  $\text{p-Br}$  (II), and  $\text{p-Cl}$  (III). In addition, the results of variable-temperature  $^{15}\text{N}$  CPMAS NMR experiments performed on  $^{15}\text{N}$ -labeled I, II, and IV are reported. All compounds form cyclic dimers linked by two N-H N hydrogen bonds which can form two different tautomers, a and b, interconverting by fast double proton transfers. The NMR experiments indicate three types of amidines characterized by different magnitudes of the equilibrium constants  $K_{\text{ab}}$  of the tautomerism. In dimers of type such as V-VIII, we find  $K_{\text{ab}} \ll 1$  (i.e., only a single tautomer in the temperature range between 100 and 300 K). In this case, the hydrogen-bonded protons are ordered and can be localized by XRD. Furthermore, the C N bond lengths and torsional and valence angles involving the two aryl groups of an amidine unit are different. For dimers such as II and III, characteristic temperature dependent  $^{15}\text{N}$  CPMAS NMR line shape changes are observed indicating that  $K_{\text{ab}} = 1$  within the margin of error. Rate constants of the tautomerism can in this case be obtained by line shape analysis. For this degeneracy to occur, the aryl group conformations at both amidine nitrogen atoms must be similar. XRD then observes disordered hydrogen-bond protons and, in principle, also disordered nitrogen atoms. However, in practice, the disorder of the latter is not resolved leading to the observation of equalized C N bond lengths. Finally, dimers (I, IV) represent an intermediate case with  $K_{\text{ab}} < 1$ , which could be labeled as "dynamic partial order". The implications of the molecular structure and the hydrogen bond and proton transfer characteristics are discussed.  
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19/3,AB/18 (Item 1 from file: 144)  
DIALOG(R)File 144:Pascal  
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09482540 PASCAL No.: 91-0272934  
Thermal-conductivity anisotropy of single-**crystal** Bi SUB 2 Sr SUB 2 CaCu SUB 2 O SUB 8  
CROMMIE M F; ZETTL A  
Univ. California at Berkeley, dep. physics, Berkeley CA 94720, USA  
Journal: Physical review. B, Condensed matter, 1991, 43 (1 p.A) 408-412  
Language: English  
Mesure de la conductivite thermique K SUB c hors du plan du monocristal entre la temperature ambiante et 40 K. Contrairement a la conductivite thermique dans le plan ( $K_{\text{ab}}$ ). K SUB c apparait etre dominee par les phonons et ne presente aucune anomalie importante a la temperature de transition supraconductrice T SUB c. A l'etat normal, l'anisotropie de conductivite electrique  $\text{Tab}/\sigma_{\text{SUB c}}$  est de l'ordre de  $10^4$  et fortement dependante de la temperature, tandis que  $K_{\text{ab}}/K_{\text{SUB c}}$  similar = 6 est independant de la temperature. Les resultats suggerent un role important de la diffusion par les defauts dans le mecanisme de transport

19/3,AB/19 (Item 1 from file: 103)  
DIALOG(R)File 103:Energy SciTec  
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03/14/2003

03279317 FRD-92-000134; EDB-92-042074

Title: Long-term behaviour of TRU-waste-bearing ceramics Task 3  
Characterization of radioactive waste forms a series of final reports  
(1985-89) No 16

Author(s)/Editor(s): Loida, A.; Peisa, R. (Kernforschungszentrum Karlsruhe  
(DE))

Corporate Source: Commission of the European Communities, Luxembourg  
(Luxembourg)

Publication Date: 1991

(53 p)

Report Number(s): EUR-13602

Order Number: TI92772858

Contract Number (Non-DOE): No F11W0098/183

Language: In English

Abstract: The aluminium-silicate ceramic matrix **KAB 78**, developed for the Immobilization of TRU wastes, has been doped with 20 wt% of  $\text{Pu}(238)\text{O}_{2.5}$  in order to irradiate the matrix by the same  $\{\alpha\}$ -dose over a period of three years, as accumulated within a storage time of about 100 000 years, when loaded with the real TRU waste. The  $\text{Pu}(238)$ -doped ceramic **KAB 78** was investigated, by means of ceramographic methods, while the accumulated  $\{\alpha\}$ -dose increased up to  $8.33 \times 10^9$  Gy ( $9.4 \times 10^{18}$   $\{\alpha\}$ -decays/g). Special attention was directed to the development of the microstructure, the **crystalline** state and the lattice constants of the matrix phases, as well as to stored energy, as a function of the accumulated  $\{\alpha\}$ -dose. The lattice constants of the matrix phases corundum and mullite were found to be only slightly enlarged. Any sign of metamictization beginning has not been detected. Changes in the micro-structure have not occurred and the amount of stored energy has been determined to be less than 11 J/g. In order to study the corrosion behaviour of the  $\text{Pu}(238)$ -doped ceramic and ceramics loaded with real dissolver residues, leach tests were performed over a period of 214 days, using either Q-brine or DI-water of up to 200 (sup 0)C. Leach rates, based on the total  $\{\alpha\}$ -activity were found to be slightly higher, when leaching the  $\text{Pu}(238)$ -doped ceramics. Reaction zones of 150 up to 600  $\mu\text{m}$  thickness were formed, with a significant decrease of Si, whereas the concentrations of Al and Pu remained unaffected.

19/3,AB/20 (Item 2 from file: 103)

DIALOG(R)File 103:Energy SciTec

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03263686 DEN-92-000927; EDB-92-026443

Title: Studies into the transport of radionuclides in the zone around the storage chamber sealing and backfilling

Original Title: Untersuchungen zum Transport von Radionukliden im Bereich der Kammerabschlussbauwerke

Author(s): Wohanka, A.E. (Physikalisch-Technische Bundesanstalt, Braunschweig (Germany). Abt. Sicherstellung und Endlagerung Radioaktiver Abfaelle)

Title: Geotechnical problems of underground disposal and transport processes. Proceedings

Original Title: Geotechnische Fragestellungen bei Untertagedeponien und Transportvorgaengen. Vortraege

Original Series Title: Veroeffentlichungen des Institutes fuer Grundbau, Bodenmechanik, Felsmechanik und Verkehrswasserbau der RWTH Aachen

Corporate Source: Technische Hochschule Aachen (Germany). Lehrstuhl und Inst. fuer Grundbau, Bodenmechanik, Felsmechanik und Verkehrswasserbau

Conference Title: Seminar on geotechnical problems of underground disposal

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and transport processes

Conference Location: Aachen (Germany) Conference Date: 3 Oct 1989

v no. 18.

Publication Date: 1990

p 94-135 (358 p)

Report Number(s): CONF-8910562--

Language: In German

Abstract: A detailed analysis concerning the granulation of debris from the Konrad mine has been carried out. The analyzed debris had the same properties as the debris, which will be used in the future, to fill up residual voids in disposal rooms or to seal off these rooms by an extensive body of debris (**KAB** modell 1). Assessing the registered data of debris, it could be shown that there are good properties for the retention of radioactive aerosols and - in connection with the voluminous residual voids - for the delay of radioactive gas too. A modell concerning the flow of activity out of filled up and sealed off disposal rooms has been described. The solutions of the specific differential equations and the relevant parameters have been derived or explained. Finally calculations of the tightness and the increase of pressure for disposal rooms with quasi-gastight seal (**KAB** modell 2) were described. Results: It could be shown that the gastightness is sufficient to reach the radiological aims and that the increase of pressure within the disposal rooms will reach values of only some hPa (mbar). (orig./HP).

Non-English Abstract: Eine detaillierte Korngrößenanalyse von Konradhaufwerk, wie es fuer den Kammerversatz und den Schuettkoerper von Kammerabschlussbauwerken (**KAB**) Modell 1 zum Einsatz kommen soll, wurde durchgefuehrt. Aufbauend auf den ermittelten Kenngrößen des Haufwerks konnten die guenstigen Eigenschaften bezueglich Aerosolrueckhaltung und - in Verbindung mit dem grossen Resthohlraumvolumen im Kammerversatz und **KAB**-Schuettkoerper - auch die guenstigen Eigenschaften bezueglich Verzoegerung von Freisetzen radioaktiver Gase aufgezeigt werden. Das Aktivitaetsflussmodell fuer versetzte und abgeschlossene Einlagerungskammern wurde beschrieben. Die Loesungsgleichungen der zugehoerigen Differentialgleichungen sowie die wesentlichen Eingangsparameter wurden abgeleitet bzw. begruetet. Schliesslich wurden fuer Einlagerungskammern mit quasidichtem Kammerabschluss (**KAB** Modell 2) Dichtigkeits- und Druckaufbaurechnungen durchgefuehrt. Ergebnis: Eine ausreichende Kammerdichtigkeit zum Erreichen der radiologischen Zielsetzung liegt vor und nur ein geringer Druckaufbau von einigen hPa (mbar) innerhalb der abgeschlossenen Einlagerungskammern ist zu erwarten. (orig./HP). Abstract Language: Deutsch

19/3,AB/21 (Item 3 from file: 103)

DIALOG(R)File 103:Energy SciTec

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02785391 DEN-89-014289; EDB-90-002605; NTS-90-015952

Title: Electron microscopy of phase and microstructure development in aluminum silicate ceramics for the immobilization of transuranium element containing wastes

Original Title: Elektronenmikroskopische Untersuchungen zur Phasen- und Gefuegeentwicklung in einer aluminiumsilikatischen Keramik zur Fixierung transuranelementhaltiger Abfaelle

Author(s)/Editor(s): Fieger, U.

Corporate Source: Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Nukleare Entsorgungstechnik Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Wiederaufarbeitung und

03/14/2003

Abfallbehandlung Technische Hochschule Darmstadt (Germany, F.R.)

Publication Date: Aug 1989

(171 p)

Report Number(s): KFK-4628

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Abstract: At the Institute for Nuclear Waste Technology (INE) with the Karlsruhe Nuclear Research Center (KfK) ceramic materials were evaluated as matrices for the solidification of radioactive alpha-bearing wastes. A suitable ceramic material, **KAB 78**, which is prepared from the raw materials kaolin, bentonite, and corundum, was examined with and without waste-simulating oxides. Applied methods were X-ray powder diffraction, scanning electron microscopy and transmission electron microscopy, both in combination with energy dispersive X-ray microanalysis. The effects of the sintering conditions and of the waste materials' nature are revealed and discussed. (orig.).